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CHILD DEVELOPMENT

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LATER DEVELOPMENT OF CHILDREN SPECIALLY TRAINED DURING INFANCY
JOHNNY AND JIMMY AT SCHOOL AGE

MYRTLE B. McGRAW[1]

INTRODUCTION

In 1932 Johnny and Jimmy, twins, became the subjects of an intensive study of behavior development at the Normal Child Development Study of the Babies Hospital, Columbia-Presbyterian Medical Center. Before the study had been under way for two years, it attracted wide interest because of the reports of a baby less than a year old swimming with his face under water, ascending steep inclines and by the time he was sixteen months old moving around with considerable skill on roller skates. These were the achievements which gave the study a popular interest, but such performances were incidental to the primary objectives which were 1) to analyze the sequential phases or changes through which a growing infant passes in the achievement of a given performance, and 2) to determine whether these phases are altered by certain prescribed conditions, viz., the daily stimulation of activity on the one hand and the restriction of activity on the other.

Such an investigation was timely because of the current pediatric and psychiatric notion that infants should not be over-stimulated and because of a general assumption following a co-twin study by Dr. Gesell (1) that the immature nervous system of the infant is unresponsive to practice effects and that development during infancy is essentially a matter of neural maturation. It is proverbial that among older children and adults practice leads to improvement in performance. If the infant is unresponsive to practice-effects, and if, on the other hand, the adult is responsive, it is a reasonable assumption that there must come a time in the course of the child's development when improvement by virtue of experience begins. It therefore seemed to the writer that if one began soon after birth to stimulate one member of a set of twins in certain activities and within certain limits to restrict the activities of the other, it might be possible to ascertain that period in life when the individual begins to profit by experience or repetition of performance. Johnny and Jimmy were selected as the subjects for this investigation and a group of 57 infants, examined at weekly or bi-weekly intervals, served as controls. The general procedure during the first twenty-two months of life was to observe both babies in the laboratory five days a week from nine until five. During this time Johnny was stimulated daily to engage in activities to the extent of his capabilities, whereas Jimmy was left with a few toys unhindered in his crib except for disturbances accompanying routine care. When they were twenty-two months old, Jimmy was given a period of two and one-half months of intensive practice in those same activities in which Johnny had been given earlier and more prolonged exercise. A detailed report of this investigation was made in 1935 in "Growth: A Study of Johnny and Jimmy" (2).

In this report it was pointed out that there is no one age period or developmental stage which clearly demarcates an earlier state of immaturity during which the child is incapable of improving through practice from the subsequent state in which improvement through practice becomes feasible. The impossibility of identifying such a critical period in the development of the individual

[1]*From the Normal Child Development Study of the Department of Diseases of Children, Columbia University, and the Babies Hospital.*

The writer expresses gratitude to Dr. William S. Langford and to Dr. Zygmunt Piotrowski, whose contributions are incorporated into the manuscript; to several staff members of the Normal Child Development Study, whose assistance and suggestions have been helpful; and, especially, to colleagues who read and criticized the manuscript.

results, it would seem, from the fact that the nervous system does not mature uniformly. There are critical periods dependent upon the maturational status of the nervous system, but these periods vary with respect to the particular activity under consideration. Before training or practice can be economically provided, it is essential to determine, by the observation of behavior symptoms, the periods of greatest susceptibility for each type of activity. It will be recalled that while Johnny was induced to roller-skate with considerable skill by the time he was sixteen months old, repeated daily practice in a seemingly simple activity like tricycling evoked no improvement either in technique or performance until he approached nineteen months of age. The discrepancy in these two activities affords a striking example because under ordinary conditions a child learns to tricycle much younger than he does to roller-skate.

It has been four years now since this special study of Johnny and Jimmy was discontinued. Although they have at specified intervals during these four years been given follow-up examinations at the laboratory, their life at home has otherwise been comparable to that of other New York children of their socio-economic status. However, an immediate question arises as to the sequelae of their contrasting experiences during the first twenty-two months of life. Now that they are just attaining school age, when a new chapter of a child's life is opened, it is desirable that we consider their relative development to date in the light of their earlier experiences.

At the time of the original report, before there had been an opportunity of observing the subsequent influence of special exercise, the writer commented, "The permanency of the expansion which an action-pattern gains through additional exercise is contingent upon the degree of fixity the behavior pattern had achieved at the time the modifying agent, i.e., the factor of special exercise, was withdrawn. It does not necessarily follow that a performance which has been developed under special conditions will be retained after those conditions are removed. Unless the behavior-pattern has become fixed, it is only reasonable to expect that there will be a loss in performance when the conditions which brought it about are discontinued. Correspondingly, if the growth of a behavior-pattern has been hindered through restriction, it is to be expected that recovery will be evident when the restrictions are removed" (3). The early investigation brought out the fact that certain activities of infants can, through exercise, be brought to a much higher level of achievement than is normally assumed, but it will require new and longer studies to determine the extent to which practice should be enforced in order to render its results comparatively permanent. It is well known that many adults who learn a performance such as bicycling in childhood can, after a lapse of years without practice, pick it up in fairly short order. On the other hand, an adult resuming his attack on a language which he has not spoken since early childhood will show more than an initial awkwardness in re-learning the language although he may acquire it with greater facility than someone who had never been exposed to it before. In other activities an adult often appears to be a virtual tyro despite his childhood accomplishments in a given field. An adult's loss of childhood skills in marble-shooting, ball throwing, etc., is such a common occurrence that it is a familiar subject for the cartoonist and other humorists. General conclusions concerning the permanent effects of practice are therefore impossible since different types of skills exhibit wide variation in their tendency to be retained or lost.

In evaluating the permanency of practice effects with Johnny and Jimmy, we shall consider first those laboratory activities in which Johnny had been given long and intensive training during infancy but in which Jimmy had received only two and one-half months of intensive training beginning when he was twenty-two months old. During the past four years, they have been examined in these same performances at intervals varying from two weeks to six months.

LABORATORY STUDIES

Tricycling. One of the most interesting attainments of Johnny and Jimmy during their period of intensive study was that of manipulating a simple tricycle. The initial practice period was begun with Johnny when he was eleven months old. It was pointed out in "Growth" (4) that this activity was initiated before his neuro-muscular mechanisms were ready for such a performance, as it was eight months before he began to show distinct comprehension of the situation. After he showed some degree of mastery he acquired an easy, skillful performance in about two months. It was also pointed out that Johnny had apparently suffered by his long and futile practice periods. Jimmy, whose training began when he was twenty-two months old - presumably when his neuro-muscular mechanisms were in a state of readiness - accomplished an easy performance in a shorter time than did Johnny. After the period of intensive training was discontinued, both boys were observed at the laboratory in their tricycling behavior, and at no time did either of them show any distinct loss in this particular skill. The twins were living at home during this time. Although they did not possess a tricycle in their own home it was impossible to ascertain whether they had had access to one in the nursery school or on the playground. On the other hand, it may be that tricycling, like bicycling, automobile driving, etc., is a type of skill which does not deteriorate appreciably through lack of practice once it has been definitely acquired.

Skating. In some of the other gross motor skills we find a different story. It was pointed out in the earlier report that Johnny, who began his roller-skating experience when slightly less than a year old, enjoyed an advantage over his twin, whose practice in this activity was begun at the age of twenty-two months. This advantage appeared to be attributable to several factors. In the first place, from purely mechanical considerations, a child who is just learning to walk possesses because of his relatively wide base and short legs greater static equilibrium than does the child who is older and therefore taller (5). In the second place a child who is just beginning to walk, has ample experience in falling, less distance to fall, and is therefore less disturbed when he falls on skates than is the older child. Furthermore, a child's achievement in a particular skill like skating is determined to some extent by the number of distracting or interfering interests which play upon a performance at a given time. The toddler of a year is less responsive to the world about him than is the child of two years or older. Johnny was at the threshold of independent walking when the skating practice was initiated and apparently experienced an advantage in static equilibrium. Also, having had less general experience at the age of twelve months, he was less hindered by distractions and emotional factors and therefore could exert himself to the limit of his neuro-muscular abilities, whereas Jimmy's performances at the age of two years were modified considerably by interference from broader interests, so that his activities at the time were not the result of optimum neuro-muscular coordinations. Even after a practice period of two and one-half months, Jimmy had still not acquired a well-integrated skating movement.

The children were given skates as a present shortly after their daily laboratory visits were terminated, but these skates were demolished within a few weeks and their parents report that they have had no other skating experience except for the follow-up laboratory tests. Their performances on these occasions corrobate the parents' report. In brief summary of the notes which have accrued on their skating behavior during these four years, it may be said that soon after their practice period both children began to show a loss in skill and disorganization of the skating pattern. When the children were about three years old, it was noted that the chief source of their difficulty was in maintaining

the erect posture when on skates. The aspect of balance had undergone greater disorganization than the actual progressive movements. Disorganization of the skating behavior was more pronounced in Johnny's performances than in Jimmy's. This difference, however, appeared to be due to Johnny's attitude of abandon and a tendency to lunge forward even though he had lost in equilibrium, whereas Jimmy adhered more to the short, stiff strokes characteristic of his early practice period. Despite this difference both children began to show an increased tendency to lose their balance and tumble, when compared with their earlier performances. Neither of them skates well today. The fact that the children showed no loss of skill in tricycling but complete disorganization of roller-skating raises the question as to why certain skills deterioriate through lack of exercise and others do not. The answer to this question is, of course, problematical since the factors which control a growing behavior are multiple and were not in this study controlled by laboratory measurement. However, from observations of other children in our study as well these particular boys it seems clear that at least three factors play an important role in determining the permanency or deterioriation of a motor skill when no special exercise of the function has occurred during a period of years. The first factor is the lack of practice per se; the second is the influence of the child's attitude toward the performance, and the third is the changing configuration of the bodily structures as a result of physical growth. It is impossible to evaluate the effect of disuse of function without taking into account the factors of attitude and organic structures. From direct observation of the twins' skating behavior the writer is of the opinion that changes in bodily proportions were of considerable significance in the disorganization of skating behavior. Actually the child of five or six years, because of his relatively long legs and narrow base, has a set of structures with which to perform the task of skating different from those of the toddler. With the set of structures characteristic of the toddler, Johnny developed a well coordinated skating movement. Johnny's attitude toward skating continued cooperative and favorable during the entire four years. There are other motor activities in which he showed no appreciable loss of skill despite the lack of exercise. It seems reasonable to infer, and certainly the character of his behavior indicated, that the disorganization was brought about not solely because of disuse of function but also because during the non-practice period important growth changes occurred in the bodily mechanisms which function in the act of skating. It is reasonable to assume that if the practice had continued he would have altered his behavior gradually to meet the new and slowly developing structural demands. Jimmy, who was less skillful in skating than Johnny at the end of their practice periods, has also shown deterioriation. The fact that both began to show marked difficulty in balancing at about the same age lends support to the contention that physiological growth was an important influence in the disorganization of their skating behavior.

Slides. Another activity which seems to have undergone alteration in the course of years, though it was not so completely disorganized as roller-skating, was that of ascending steep slopes. It may be recalled that (6) at the end of the experimental period, Johnny was able to ascend easily a slope of 70 degrees and Jimmy could with somewhat less ease, scale the incline of 61 degrees. For some months immediately following their practice period Johnny showed, on follow-up examinations, no loss in motor skill in mounting even the steepest slopes. Jimmy, on the other hand, showed some initial loss, but then began to improve both in motor skill and in persistence. Alterations in their methods of ascending the slides became most obvious when the children were about three years old. At this time it was noted that they had great difficulty in managing their longer legs. They would attempt to ascend on their knees while grasping the ridges and

pulling vigorously with their upper extremities. The most outstanding individual difference was Jimmy's persistence in trying to ascend in this manner while Johnny, after a few trials, would shift to the more efficient method of using his toes. He also climbs the steep slopes with greater ease and muscular coordination. He gives the impression of having better gripping power in his toes than Jimmy or most six year old children whom we have had occasion to observe in this activity.

At the present time the writer is less impressed as to the extent to which daily practice might have functioned in Johnny's achievements on the slopes than she was at the time of the original report. Practice undoubtedly operated in his ascending slopes of 61 and 70 degrees respectively. Other infants in our laboratory, however, have ascended slopes as steep as 40 or 48 degrees without great difficulty even when they had not been given systematic practice in such performances. To the experienced observer, it is obvious that infants can more easily ascend slopes of this order than can older children. The advantages enjoyed by the infant appear to be due somewhat to differences in body configurations. The center of gravity in the infant's body is relatively higher and his legs are relatively shorter. It is therefore possible for him to get his chest, and thereby his center of gravity, nearer to the slide without raising his pelvic girdle too high. It is also possible that the texture of infant skin is such as to create a higher friction coefficient between his hands and feet and the underlying surface. Whatever the reasons may be, the fact remains that the babies can stick to and ascend these slopes with greater facility than the older children. The difficulties of older children are manifested by slipping or a deficient gripping power in the toes and in managing their long legs. Alterations in the slide climbing behavior of Johnny and Jimmy during the past four years were of a similar nature. It is a reasonable inference, therefore, that growth changes in body proportions played a large role in altering their method of ascending slopes. Any permanent effects of the early practice which Johnny enjoyed are general, as indicated by superior motor coordinations, except for the comparative readiness with which he shifted from an inferior to a more effective method of managing his long legs and using his toes.

In descending these slopes neither Johnny nor Jimmy at any time showed any distinct loss of motor skill or alteration of method. During the first few months following the practice period Jimmy was more timid and required greater urging to descend but after the first three or four months he overcame this hesitancy and manifested no lack of motor skill subsequently.

Getting Off Pedestals. Post-practice behavior of the children in getting off pedestals is similar to that of descending the slides, since no definite deterioriation of motor skill was manifested by either of the boys. The pedestals ranged in height from 14-1/2 to 63-1/4 inches. At no time during the four-year interim has Johnny shown any loss of skill or hesitancy in getting off these pedestals. At the time the practice period was terminated Jimmy was easily and deliberately climbing off the 63-1/4 inch pedestal. During the months immediately following his two and one-half month practice period, there appeared a regression in his general attitude or emotional adjustment to the situation which interfered with his motor performance. He would complain even on the lower pedestals and would refuse to get off the higher ones. Behavior of this character continued more or less until he was about four and one-half years old when his attitude seemed to change to cooperation and some enjoyment of the situation. The failure of Jimmy to get off the higher pedestals was not so much a deterioration of the motor coordinations formed during his practice period, but rather a recurrence of attitudes established prior to his practice period. Once he could be induced to climb down he could do so with considerable ease. He has never, however, attained the agility which Johnny manifests in

this performance. At the present time the individual differences are indicated not so much in terms of their achievements as in the degree of coordination which they show when performing the same act. This superior motor coordination on Johnny's part is reasonably attributable, in a measure, to the difference in amount of exercise the children received in the activity during their first two years of life. Climbing off pedestals is another type of performance, the motor aspects of which do not suffer appreciable loss through lack of exercise once the motor habits are well established.

Jumping. In the report of early behavior of the children in the jumping activity (7), it will be noted that in this type of performance the attitude of the child played a major role in determining the somatic response. At the end of the experimental periods the investigator felt not only that Johnny had established a cooperative attitude, but that the integration of the essential movements in jumping had been accelerated. Jimmy, on the other hand, even after two and one-half months of daily exercise could not be induced to jump off a tall pedestal into the outstretched arms of an adult. It seemed unquestionable that Johnny experienced an advantage in this performance by having had practice in the activity before his increased perceptive and emotional capacities added complexities to the somatic or motor aspect of the behavior. During Jimmy's two and one-half months of practice (at two years of age) his attitude became definitely more acquiescent, but the alteration of attitude was not sufficient to effect an integrated jumping performance. At the end of the exercise periods, when they were 26 months old, Johnny was gleefully leaping from tall pedestals with even a slight "spring" as he threw himself forward. Jimmy, happy enough, would stand on the pedestal, shifting his weight from one foot to the other, squatting, and in other ways indicating his urge to go forward, but was not quite able to consummate the performance. During the first few months after their practice periods were terminated, Johnny began to show a less cooperative attitude and for a while there was even less motor skill in his action, that is, when he did jump there was noticeably less grace in his movements. This loss or deterioration was, however, temporary and intermittent, appearing at intervals over a period of six or eight months. After that relatively brief period jumping was again one of his most enjoyable activities and he subsequently showed no distinct loss in motor coordinations. It appeared to the experimenter that this early change in attitude was due in part to imitation of his brother's behavior rather than to real hesitancy in carrying out the act.

For some months after their practice periods terminated Jimmy showed a definite regression in his behavior. He would cling tenaciously to the adult, refuse to stand up on the pedestal and cry lustily. When he was about three years old, however, his attitude became more acquiescent, and his behavior comparable to that manifested during his exercise period. He would stoop or squat on the pedestal, reach toward the adult, and if the adult was only about eight or ten inches away he would throw his shoulders forward. He has steadily shown improvement and is now willing to jump, but he has not manifested the abandonment nor been willing to jump as far as Johnny. In this activity there has been a definite residual of the early training period in Johnny's favor.

Purposive Manipulation of Graded Stools. "Growth" (8) offers an analysis of the children's development in manipulating stools of various heights in order to obtain lures which had been placed out of reach. At the time the experimental or practice period terminated, neither of the children had attained the maximum degree of proficiency in this activity. At that time Johnny would juggle eight different pedestals, ranging from 7-1/2 to 63-1/4 inches in height, in order to climb up and obtain an object hung some nine feet above the floor. However, he still had a tendency to push all the stools in a cluster, not seriatim, usually with the tallest one beneath the lure. On a few occasions he had shown some tendency to eliminate unnecessary pedestals, but this aspect had not become

a fixed part of his behavior activity when the practice period ended. Jimmy, on the other hand, was, at the same time, able to manipulate two or three stools successfully in order to obtain the lure placed upon the 63-1/4 inch pedestal, but he had at no time successfully obtained the object hung from the ceiling, which arrangement demanded his making use of the taller pedestals for climbing. Johnny's practice period began in this activity when he was eighteen months old, and Jimmy's when he was twenty-two and one-half months old. It was pointed out in the original report that the time span between the inception of the practice periods for the two children was not great and therefore came nearer to striking the critical period for both children, i.e., that period when development in this type of activity would be most susceptible to advancement.

It would require too much detail in order to delineate the various changes in their performances in this situation during the four years they have been returning to the laboratory for follow-up examinations. It is sufficient to state that at the present time, as a rule, Johnny and Jimmy both arrange the pedestals purposively to obtain the lure when it is hung at least nine feet above the floor. Both children carefully discriminate in placing the tallest pedestal under the object. Johnny, however, carelessly and dexterously pushes all the other seven pedestals in a cluster about the tallest one with no definite order or arrangement. He then goes clambering up two or three of the stools, as may be necessary, for him to gain the top of the tallest one. He shows no hesitancy or difficulty in bridging wide gaps in order to pass from one stool to another when they are not in juxtaposition, and he shows no hesitancy in standing erect on the tallest stool in order to reach the lure. It never seems to trouble him that he has pushed all the pedestals in a cluster although he makes use of only two or three for the purpose of climbing.

Jimmy, in contrast, works diligently arranging the stools in a graded sequence with the tallest one carefully placed under the object. Once he has them arranged in a stairway he will climb up and stand on the one next to the tallest pedestal, but it is only rarely that he can be induced to climb up on the tallest one so as to obtain the lure. He has definitely less courage and less motor coordination in handling his body. It is the writer's impression that Johnny's failure to arrange the pedestals in order according to their relative height is a residual of his habits established earlier when his discrimination was inadequate to allow him to do so. The fact that it is not lack of discrimination at the present time was brought out one day when he was shown some movies of his performances taken before he was two years old. This particular reel included an occasion when he had arranged most of the pedestals in stair formation. Johnny's remark was, "That isn't me. I didn't put them straight like that." With his greater agility he doesn't feel the need of an orderly arrangement, whereas Jimmy, who is more cautious in climbing, tries to make that aspect of the situation as easy as possible. The impression that the tendency of Johnny and Jimmy to employ all eight stools, even though three properly selected ones would have sufficed, is a residual of their early practice in this situation was substantiated by the behavior of a small group of children from six to eight years of age who had never been exposed to this particular situation before. At this stage of maturity these children would make use of only a few of the pedestals, even if they were not properly chosen. In other words, they had developed beyond the stage of thinking an additional one would help solve the problem.

Purposive Manipulation of Graded Boxes. This situation (9) called for the stacking of two or more boxes of different size on top of each other in order to obtain a lure suspended from the ceiling. When the practice periods were discontinued Johnny was skillful in stacking three boxes in order and had occasionally successfully stacked four boxes, but he was actually lacking in physical height to stack the fourth box easily. Jimmy, by contrast, at the same

chronological age and after a period of two and one-half months' practice, had not arrived at the stage of placing one box on top of another for the purpose of climbing up to reach the lure. Therefore, in this situation neither child had attained his maximum development in performances of this order, though Johnny was considerably advanced beyond Jimmy.

In the four year interim during which they have been given follow-up examinations in this situation Johnny has shown many fluctuations, the details of which would be too laborious for the reader if reported here. Jimmy was three years old before he began placing one box on top of another, and it may be that this is about the age when children would normally begin to engage in activities of this order if they were not given specific stimulation to do so. At the present time both children usually pile all four boxes on top of one another in order to obtain a suspended lure. Jimmy is more careful in arranging the boxes in order according to size, that is, with the largest one on the bottom and the smallest one on the top. He often shows a reluctance to climb up after he has neatly arranged the boxes. Johnny, who is careless and less discriminative in the order of arrangement, shows greater skill in climbing and maintaining his balance on even a quite unstable structure. It would seem that in this particular situation Johnny's advanced motor skill and courage operate to make him either careless or less discriminative of the relative sizes and placement of the boxes. Again, Jimmy, who has less courage in motor performances, is more meticulous in making arrangements, so that the motor aspect will be as easily accomplished as possible.

When a long range view is taken covering the twin's behavior in these several laboratory situations, during the past four years, it is clear that there are at least three different situations in which Johnny showed no loss of proficiency and in which any loss which Jimmy might have shown could be attributed more to his emotional or attitudinal status than to motor inadequacy. These activities are (a) tricycling, (b) getting off pedestals, and (c) descending slides. When we examine these activities we are struck with the fact that their mode of performance has suffered no major alteration. In other words, so far as the motor aspect of these performances goes, the twins had achieved a high degree of integration or maturity at the time the practice periods were terminated. Given relatively the same heights and slopes and a tricycle of relatively the same size, the two year old and the six year old child tend to get off pedestals or go down slides in essentially the same manner, and also to propel a tricycle in the same fashion.

In at least two different activities, and in certain aspects of a third, the mode of performance seems to have changed primarily because of alterations in the boys themselves as an aspect of physical growth, specifically because of their relatively longer legs and the shift in their centers of gravity. These alterations are especially noted in skating and in ascending steep slopes. The influence of changes in bodily growth upon behavior was also observed in the way in which the boys manipulated graded pedestals to obtain suspended lures. Actually, because of his short stature, the two year old child who strikes the tall pedestals nearer their base is less liable to tip them over and can, therefore, move them with greater ease than can the six year old whose contact point in pushing strikes the pedestal nearer its center of gravity.

Purposive arrangement of pedestals and manipulation of boxes were activities which were probably in the most fluid state at the time the special practice periods were terminated. For that reason the performances of both children have shown greater fluctuations in these situations than in activities which were more stabilized. While the achievement difference of the two boys were great when special practice was abandoned their relative efficiencies have, during the past three years, approached each other though the two children adopt somewhat

different methods in demonstrating their merits. As might be expected there is comparatively less diversity in their present achievements in those activities which were not so stabilized when practice was abandoned.

Jumping from a tall pedestal seems to stand in a class by itself. It appeared that through practice the motor aspects of this performance had been greatly accelerated in Johnny. However, his performance had reached a high degree of fixity and suffered only a temporary loss immediately following the practice period, whereas, the attitude which prevailed with Jimmy during his period of isolation had become so fixed that the two and one-half months of practice he experienced when he was about two years old were inadequate to counteract it. With increasing maturity Jimmy's emotional disturbance was somewhat abated, but it has never become sufficient to eliminate obvious muscular tension in his performance even though he will complete the jump.

Swimming. No follow-up study has been made of the swimming behavior. It will be recalled that the original investigation of this activity (10) terminated when the children were seventeen months old. During the ensuing four years there have been three or four occasions when their aquatic behavior was observed. Until the age of six years Johnny showed noticeably greater fortitude in jumping into the water and playing about, though he was not able and was not urged to engage in independent swimming. However, on the last occasion they were taken to a lake, when they were a little more than six years old, Jimmy was quite brave about jumping into the water with a ring around him for support, whereas Johnny showed some inhibition about doing so. Just why this change in attitude should have taken place is a matter for conjecture. An interesting difference was noted in their swimming strokes. When supported by a ring, both would venture out beyond their depth, but Jimmy maintained a vertical position as he made rapid treading movements with his legs. Johnny, on the other hand, assumed the horizontal position and engaged in graceful crawl strokes of the more advanced swimmer. Just why he should have taken up a method of movement which by experts is considered to be more efficient than the natural dog paddle of beginners, is beyond present explanation as no attempt was ever made to teach Johnny strokes during his period of infantile swimming and at that time he used the typical dog paddle. It is unfortunate that this behavior could not have been studied further, especially since it appears that this is another activity in which the body proportions constitute a large influence in determining the manner of behavior. An infant, whose head is relatively heavier with respect to his total body, cannot maintain his face above the water level. Beginning swimmers between the ages of four and six years have a tendency to maintain a vertical position, if allowed artificial support, and their first movements without support are of the struggling order.

Interpretation. In the light of their subsequent behavior, both in and out of the laboratory, it is safe to state that at the present time Johnny usually manifests greater motor coordination and daring in physical performances. Jimmy, who is more awkward and timid, exercises devious methods of rendering more easy the motor aspect of a given activity, so that both children may end up with the same result in terms of final accomplishment.

It has been pointed out that the degree to which an accelerated activity may retain its advanced status after the modifying factor of intensive exercise has been withdrawn is proportional to the degree of fixity the behavior pattern had attained when practice was discontinued. Fixity in this connection means whether the manner of performance had stabilized into a well integrated movement. Examples of well stabilized activities which manifested no major alteration through lack of practice are tricycling, getting off pedestals and descending slopes. Manipulating pedestals and boxes was in a fluid state, and their subsequent performances have shown many fluctuations.

Fixity in mode of behavior, however, is not the only factor determining the permanency of acceleration. Another important factor,- viz: organic change within the individual, - has been recognized only by the analysis of later performances in skating and ascending slides. Johnny's mode of performance in these activities when he was two years old was highly skillful and of an order comparable to that of the efficient adult engaging in a similar activity. If one considered the activity in the abstract, one would say that his skating and slope-climbing behavior had attained a high degree of fixity. Yet these activities suffered alteration, or loss in skill. This loss of skill appears to have been due primarily to change in bodily proportions. Thus it seems that a child may, in a given activity, attain a high degree of skill and his manner of operation may be the most approved or efficient with the organic structure he has to work with at the time. If, however, at a later age he has a different set of organic structures for performing the same activity, then his behavior may show disorganization characteristic of the novice. Retention of general muscular coordination may persist but the actual patterning of the particular skill or behavior will be interrupted until the child has learned to operate the new set of body mechanisms. The comparative behavior of Johnny and Jimmy in roller-skating illustrates this point. Even though the activity became disorganized in both children as they grew taller, superior general motor coordinations could be detected in Johnny's movements.

Johnny's superior motor coordination is evinced not only in adaptive skills as mentioned above but also in the common, more organic motor movements, such as the assumption of an erect posture, walking and falling. Quantitative determinations of their efficiency in walking were ascertained periodically at six month intervals from the time they were about two years old. While these measurements are too scattered to justify elaborate treatment, they do show that Johnny was consistently a little ahead of Jimmy, and to that extent these objective measurements corroborate the observational data.

In summary it might be said that the alteration or deterioration of performance, particularly motor performance, through lack of exercise or practice over a long period of time is determined 1) by the state of maturity the activity had attained at the time the practice was withdrawn 2) by alteration in body mechanics or other physical changes which necessitate an alteration in the form of the behavior pattern, 3) by change in emotional or attitudinal adjustment which operate as an inhibiting or facilitating factor in a particular performance.

ATTITUDES. In evaluating the influence of attitudes upon somatic performances we have ordinarily considered only the attitude prevailing at a moment and concomitant with a particular motor behavior. It is well to consider also the persistence of a characteristic attitude which seems to predominate from day to day when the child is confronted with the same situation. That is, if a child week after week is placed on a pedestal and requested to jump to an adult and if on each occasion he stoops, clings to the adult and cries, then it may be said his characteristic attitude for the period of time is one which inhibits the motor performance of jumping. If, however, after a period of months he begins to show more fortitude not only in the jumping situation but in all comparable activities, then the possibility of general increase in emotional control warrants consideration. More specifically is the older child, because of his physiological maturity, capable of attitudes and adjustment which could not be evoked from the infant or younger child. It was pointed out in "Growth" (11) that an attitude, at a given moment, may arise from some developmental imbalance of the neuro-muscular system. For example, the baby who pulls himself up beside the bed and stands crying lustily may do so because he has not developed the concomitant coordination of letting himself down to the sitting position. The attitude arises from the organic status of his neuro-muscular development and

not from some personal disagreeable experience associated with that situation. Likewise, it would seem, a change in attitude may be brought about not through direct and individual experience in a specific situation but through the integration of other aspects of development i.e., as a result of general physiological development. It is common observation that the period of greatest irritability, negativism, temper tantrums, etc., is around twenty-four to thirty months. These common observations are substantiated somewhat by the investigation of Reynolds (12), who shows that there is a diminishing manifestation of negativism after two years of age. Anderson, (13) interpreting Olson's (14), study of "Problem Tendencies in Children," regards the period between two and four years as one in which "a fanning out of emotional life" takes place. It seems evident from Anderson's discussion that he has in mind not only diminishing emotional flare-ups in the older child but increasing differentiation and specificity of emotional expression. The older child gets angry at things which should make him angry, while it is common observation that the younger child may go into a tantrum when apparently everything is being done to appease him. It is also common knowledge that the intellectual and motor abilities of the two year old child have not attained equilibrium.

It seems reasonable to ascribe this characteristic and trigger irritability of the toddler to the many developmental behavior potentials which he has acquired during the first two years of life, but which have not been organized into adequate social responses. When these behavior potentials become integrated, then the child achieves a degree of emotional maturity regardless of his personal experiences in particular situations. In other words, emotional maturity may arise from increasing integration of intellectual and motor development as well as from direct personal and conditioning experiences. These statements sound tautological. It is difficult to make them otherwise since the different aspects of a behavior activity are interdependent and mutually influential. Illustrations may add some clarity to the analysis: A child who is just beginning to walk may leap off a tall pedestal without hesitancy because he has not developed adequate powers of height discrimination to appreciate all the possibilities of the situation. A little later, when his powers of discrimination have advanced, he squats and refuses to jump. Again it must be emphasized that his behavior has changed not because of an unfortunate personal experience but because of development in another aspect of his behavior. At this time he has adequate motor mechanisms for jumping but he has achieved powers of discrimination and for a time the one functions to inhibit the other. Subsequently when the two types of development become organized and well integrated he will again leap from the pedestal and his attitude is acquiescent or cooperative not for lack of discrimination but because he can exercise his motor functions in terms of his discrimination.

In a discussion of the gross chronological periods when the most rapid development occurs during the first two years, the following categories were suggested in "Growth" (15):

> "During the first four or five months the behavior of the baby is still at an infracortical level. Therefore, the greatest increment of development in behavior at this time consists of a gradual recession of some overt primitive reflexes as behavior-patterns of a higher order begin to emerge.
>
> "Growth during the second period is shown largely by an ever increasing control of the individual infant over motor activities in the upper part of the body, that is, in the region of the head and shoulder girdle.
>
> "During the third period the greatest increments in behavioral

development are observed in the motor activities involving the lower part of the body - in the region of the pelvic girdle and lower extremities.

"During the fourth period great strides are evident in the development of an understanding of relationships - associational, conditional, and symbolic - of retention and recall of these relations, of comprehension and use of language, imitative tendencies, et cetera."

If a multitude of behavior potentials have been acquired during the first two years, it is a reasonable inference that in the immediately following years rapid development will be in the nature of integration or organization of these more or less independent behavior potentials. A concomitant development of this integrative process will be an increased degree of emotional stabilization. General observations of children's behavior support this hypothesis.

A study of the notes on Jimmy's attitudinal adjustment to the laboratory situations during the last four years indicates that a general maturing began to take place when he was about three years old. During the first year after they left the laboratory his attitude on return visits was infantile, comparable to that manifested during his period of restriction. He would cling to the experimenter, cry and refuse to go through with many of the performances for which he obviously had adequate neuro-muscular development. At about the age of three years, he began to show a more interested and cooperative attitude; the change was shown in practically all the laboratory situations. His motor performances began to improve and have continued to improve to the present time.

Since no definite effort was made during this time to re-educate his attitudinal adjustments, it is assumed that the change was a result of gradual development in understanding and integration of his behavior in general. Jimmy's responses both in and without the laboratory are more representative of the typical child of his age than are Johnny's. This period of development in emotional and social adjustment achieved by Jimmy parallels the period for such development in children in general as ordinarily observed.

One attitudinal difference in the two children which was marked during their experimental period persists even today, though the difference is less marked than it was when they were about two years of age. Jimmy has always been more concerned with end result and Johnny with modus operandi. It cannot be said that Johnny's greater interest in the way things work rather than in obtaining lures arose from the more extensive laboratory experience. It is however reasonable, from the very nature of the laboratory experience, to assume that it was not without influence in developing such an attitude. Here he learned to work for the sake of performance even when the lure had no particular appeal. The fact that this difference in their interests was more marked during the experimental period than it is today would in part justify the opinion that the laboratory experience influenced Johnny's development in this respect. At the present time a sort of rivalry exists between them, but it is counter-balanced by their spirit of comradeship. In the main, they appear to be less sensitive to failure than most children of their chronological age who have come under the observation of the writer.

PERSONALITY DEVELOPMENT. In view of the importance attached to the early experiences of life in determining later personality makeup, and in consideration of the rather popular notion that over-stimulation during infancy forecasts a neurotic child, two attempts were made to evaluate the personality and social adjustments of the children as of six years of age. Dr. William S. Langford, through psychiatric interviews with the mother and children, arrived at the following evaluation of the children's emotional and social adjustments as of today:

"It is difficult to discuss these two children without stressing the differences between them and without speculating as to possible causes of these differences. Johnny and Jimmy both are regarded by the mother as happy children who benefited by their experiences in the Normal Child Development Clinic. There are no particular difficulties in home management with either of the boys. The mother believes that both, as a result of the clinic experience, are able to meet with people and adjust better in social contacts outside of the home than do her other children. When playing with the older siblings, they both are able to adapt their play to the situation; when playing with the girls it is dolls, and when playing with the boys it is guns and cowboys; they are equally happy at each type of play.

"There has been a difference in the attitude toward the two children at home, in part coming out of the fact that Johnny was the 'subject' in the clinic. This difference in attitude would seem important in the genesis of some of the differences between the two boys. Although the family tried to realize that the selection of Johnny for the conditioning experience in the clinic was not because of any favoritism, it was difficult for them not to favor Jimmy and not to try to make up for some of the things he did not get. During the latter part of the second year, after newspaper reports of the experimental studies had been published, they would, among other things, take Jimmy and encourage him to jump off the icebox. However, the experiences in the home, which would seem to have given Jimmy the greater security there, were more a result of circumstance. In their infancy when, at the end of the clinic day, they were returned home, Johnny would be tired and go to sleep; Jimmy on the other hand would be wide awake and ready for play and socialization with his parents and siblings. For a time Jimmy would strike Johnny and take away his toys; Johnny would not seem to dare to hit back. One wonders strongly if this, too, was not a result of attitudes in the home.

"Jimmy seems to be more at ease in the home situation where he is the leader of the two boys. He usually bosses Johnny about. Jimmy is quite apt to come home with tales about Johnny and tell what he had done outside. The parents, one feels, do not particularly encourage him in this activity. Jimmy wakes up quickly and is on the go all day as a rule chattering a blue streak about whatever comes into his mind. He seems closer to his mother; talks more with her and likes to sleep with her. When he is put to bed with another sibling, he will frequently come into his mother's bed. He definitely prefers his mother to his father and feels that she likes him best. He is helpful about the house and likes to assist his mother in tidying up and washing dishes. Jimmy cries easily when things do not go his own way or if he is scolded. He indulges in mild temper tantrums consisting of stamping his feet when he cannot get what he wants. Earlier, at about two years of age, he went through a period of severe temper outbursts with breath-holding.

"Johnny gives evidence of some tension; he has always been a nail-biter, and the mother states that he is a 'wiggler', cannot sit still in a chair and from time to time displays quite restless sleep. In addition, Johnny has always been enuretic nightly. This is difficult to interpret as enuresis seems to be a family failing. There was difficulty in establishment of the day habit with all of the older siblings and one brother did not stop his bedwetting until nearly eleven years of age. Jimmy still wets his bed occasionally although

the mother did not tell of this until some time after the initial interview. In addition, an adult member of the family will occasionally wet his bed. The mother feels that this tendency comes from the father's family where all the members have a tendency toward urinary frequency and urgency. Johnny, among all of the Woods children, is a thumb sucker; this began in early infancy and continues at bedtime even today although it used to be more marked and occur in the daytime also. He sucks the left thumb, and as an accessory movement pulls his own or bed partner's hair with the other hand; usually the latter. The sucking is rather vigorous and the accessory movement is so pronounced that most of the siblings prefer not to sleep with him. Johnny is somewhat ashamed of this habit and was disinclined to discuss it at first. Johnny is the quieter of the two children and rarely holds conversations with the other members of the family. Mother believes he is 'deeper' and 'when you least expect it Johnny will say something'. He is dependent on his mother in being washed and dressed and tends to play in his bath. One feels that this slowness is more a result of preoccupation than of a desire to have the mother do these things for him as the mother becomes irritated at his slowness and finally does it herself rather than wait for him to complete it. Johnny is not thoughtful or helpful about the house, but tends to be 'destructive and throw things around'. The mother feels that Johnny has no fears and thinks that he would be better off if he were a little more cautious, especially in his attitude towards dangerous occupations, such as crossing streets. In the home, Johnny has a philosophical attitude and takes things as they come; he is not upset when he cannot get his own way. There are no temper outbursts and he rarely cries. During the past year he has shown a tendency to play with fire, but otherwise has shown no overt behavior difficulties. Both children when observed in the interview were friendly and cooperative and talked freely. Both boys, in common with two older siblings, speak indistinctly with a lisping difficulty in articulation suggestive of 'baby-talk'.[2]

"Jimmy showed a good deal of spontaneous chatter, but was quite apt to grow almost incoherent in the rapidity with which he spouted out detail after detail and leaped from topic to topic. He showed no marked preoccupations, but reacted to the questions immediately without taking thought as to how he answered. He talked a good deal of Johnny and showed a warm affection towards him. At the same time, he tended to bring out Johnny's bad points, telling of his enuresis and hair pulling and stating that Johnny is 'the bad one at home; bad at home and bad in school'. He said that Johnny wanted to be a drunken man when he grew up. He likes to play with Johnny best, and brags about how funny he is. Many of Jimmy's statements seemed to be made for effect and with a desire to produce a laugh as he would immediately contradict himself. His general attitudes and behavior seemed quite typical of an outgoing, exuberant and quite usual six year old boy. He reacted without thinking and was responsive to environmental changes. In one interview when the examiner was weary, Jimmy reflected the subdued and more quiet atmosphere. Jimmy in his drawing drew a watch which he then cut out and pinned to himself, strutting around with evident pleasure at his self adornment.

"Johnny in the interview presented a quite different picture from

[2]*Early nursing habits of the two children seem to have been about the same. The mother believes that Jimmy would go to sleep at the breast during the first three or four days but this was not corroborated by the hospital record.*

that of his brother. He was friendly and cheerful but not so spontaneous. Attention was difficult to hold; he would be distracted by extraneous noises, but more often by passing thoughts of his own which would result in a seemingly irrelevant answer. He was thoughtful in answering questions and seemed to weigh his answers. His interviews came after Jimmy's and he seemed to feel that he should have everything that his brother had had; making sure that he sat in the same chair, had his words written down, drew pictures, and took home a pencil as a gift. His attitude towards the members of the family was somewhat different from Jimmy's. He definitely prefers his mother and sister whereas Jimmy prefers the 'toughest' brother to the sister whom he soundly denounces as being dumb. Johnny is quite fond of his twin brother, but does belittle Jimmy's ideas of wanting to grow up twice; he himself would prefer to keep on growing until he became a giant. He did tell of a dream which he was careful to point out was 'make believe' in which an old witch hits Jimmy. Johnny talks of most of his difficulties quite freely, but is hesitant about mentioning the hair pulling. He shows a definite tendency towards self evaluation and self criticism which is not present in his brother's output. He also shows good imaginative ability and reveals in his stories evidence of a rich phantasy life although he will not express these when questioned directly. His drawings are rather well done and are not, as were Jimmy's copies of something he sees, but rather a product of his own imagination.

"Attitudes of both children toward the clinic were those of its being a pleasurable experience with the exception of having to take their clothes off. Jimmy, however, tended to protest that he liked Dr. McGraw better than Johnny, although both felt sure she had no preferences. In the clinic situation it would seem that Johnny has the greater security and tends to be the leader and to boss Jimmy about. His reactions at the birth of Dr. McGraw's child would tend to bear out his need to be wanted there.

"In conclusion one might say that the boys present quite different pictures. Johnny exhibits in the home certain evidences of tensions; nail biting, motor restlessness, persistent thumb sucking as well as enuresis. The last symptom, however, is difficult to evaluate because of its prevalence in the family, and it is also present to a lesser degree in Jimmy. These symptoms could well come out of Johnny's lessened security in the home situation where his brother has been preferred and given more attention, and earlier, a greater amount of affectional demonstration. It would not seem that the 'conditioning' in the clinic had much to do with these. The restlessness, nail biting, and sucking do not occur in the clinic setting, and the boy has great security in his relationship with the clinic personnel, especially Dr. McGraw. I should not feel that undue pressure for success in various accomplishments was a factor in this as the boy enjoyed his work. This latter, however, would seem of importance in giving Johnny his attitude of evaluating and looking over a situation.

"Jimmy is the outgoing, helter skelter type of child who lives for the moment. Johnny is the more serious, thoughtful and contemplative youngster who looks to the consequences before he acts. Jimmy reacts mostly to external stimuli, Johnny as a result of his more active inner life reacts in a less direct manner to external stimuli and frequently gives the impression of preoccupation. Johnny gives the impression of being capable of weathering more serious environmental difficulties without blowing up because of his greater capacity for working

things through; but once upset, he would respond more slowly to efforts for readjustment. Neither child seems to have suffered from the experimental study. Both make adequate social adjustments although in different fashions. The differences in their personalities may well be largely constitutionally determined and not entirely the result of their diverse earlier experience. However, one feels that these experiences are of importance. I should feel that the home attitudes were of great importance as well as Johnny's 'conditioning' and they do seem a little easier to evaluate."

Dr. Langford is in a peculiarly favorable position to make these interpretations since he knew the children during their experimental period and has had occasion to see them from time to time around the laboratory in addition to the specified psychiatric interviews. It is especially interesting that the opinion concerning the personality make-up of the two children as expressed by Dr. Langford is corroborated by an interpretation of their reactions to the Rorschach test. These tests were administered by Miss Jane Sills and a blind analysis was made by Dr. Z. Piotrowski. Excerpts from Dr. Piotrowski's reports referring to Jimmy's record state "this boy probably makes the impression of a rather typical average child of his age, emotionally immature. Toward the environment he appears to react in a rather self-centered and labile emotional manner, and he seems to have a rather poorly developed inner life. His reasoning power is not above the average, and he does not seem especially observant. He appears to lack the capacity to preoccupy himself with imaginative and instructive games. Compared to his brother's record, he is childish, as one would expect a child of his years to be. His brother appears more independent in his actions, more individual, while this boy seems to be more dependent, more appealing to adults who like to play the role of protectors to young children." Concerning Johnny's record Dr. Piotrowski writes, "The complete lack of color responses in the presence of a good human response suggests that the child's reactions to the environment are determined by promptings from within himself rather than by changes in the outward situation. Probably, the child tends to be rather impersonal in his relations with people, and one might find a certain lack of emotional warmth in his attitude toward people. Although his reactions seem to be rapid, he is fairly well aware of his psychic experiences. Occasionally he is given to feelings of insecurity and uneasiness, and it is my impression that at such times the boy tends to be brave against his liking. Intellectually he seems to be above the average since only the intelligent among the small children tend to have a human movement response. Since the boy seems to lack the capacity for an immediate and effortless emotional adjustment to the environment, it is the intellect which carries the burden of adjusting. It is probably best to make a contact with him on a rather intellectual and impersonal basis. His thinking would appear to have a common sense quality with occasional excursions into imaginative fantasies. His mental independence does not, however, seem to be characterized by negativism or aggression. On the whole, this child is rather self-confident and probably would impress one as capable of taking his future into his own hands. He probably gets along well with only a few children while his brother fits in better with any children's group." On the basis of the child's reactions Dr. Piotrowski correctly surmised Johnny's record to represent that of the "trained" twin since from the nature of Johnny's earlier experiences "he would have had a better chance to develop his inner abilities and the habit of self-observation for the purpose of avoiding future mistakes in well standardized situations."

In the main, these two interpretations of the personality differences of the children are in agreement. They are also in accord with the general opinion of

the writer, whose observations of the children during their entire life has been both intensive and extensive. According to the writer's observations, outstanding personality differences are Johnny's stoical and rather philosophical attitude in disagreeable situations, and his escape by indulging in his own phantasies. Jimmy is more loquacious, is more conscious of, and bids for the approval of his audience. Consequently, he is more appealing to the casual observer. Since infancy he has looked and played the part of a clown. He is rather happy-go-lucky, and reflects his home environment more directly. Johnny employs a more subtle method of revealing his feelings. It appears that the less frequent contacts with the laboratory after the age of two years have been a handicap to Johnny. Apparently having heard that younger twins came here, he spontaneously inquired "Dr. McGraw, why did you need another baby when you sent me home?" When they left here, Jimmy went to a home admittedly more favorable to him; he also had less of an adjustment to make. In some ways Johnny's experience here was poor preparation to meet the rough and tumble of a large family life. He had learned in many ways "to take it" and the reports indicate that he has had more than his share of taking. At home and at school Jimmy is rather the bully, often casting aspersions on Johnny and threatening his confidence. For all that, the affection between the two boys is warm. Despite the amount of public notice they have received, they are remarkably free from self-consciousness.

To evaluate the extent to which these personality differences are constitutional, or determined by their early experimental experiences or their later home environment, is beyond achievement at the present time and will probably remain beyond the scope of actual determination for all time. However, their experiences and behavior have been studied and chronicled as to detail in a way which is not obtainable for the average school child. If these reports and opinions serve a useful purpose in guiding the educational careers of these two children, they may at the same time be of even greater significance in showing the extent to which knowledge of early childhood experiences is of educational and psychiatric value in the adjustments of the adolescent or adult.

INTELLECTUAL AND PHYSICAL DEVELOPMENT. Both Johnny and Jimmy have consistently rated within the normal range on standardized intelligence tests. The Rorschach test indicates that Johnny is somewhat accelerated in intelligence. This paper is not the occasion to discuss the correlation of the Rorschach with the Stanford-Binet, the Minnesota, or other well-known intelligence scales. It may be that the Rorschach taps a quality of intellectual processes which is not measured by the items included in these various tests.

There is one fairly common opinion among the laity at least which might at this occasion be corrected. Some have labored under the belief that special training during the first few years of a child's life will in some way raise his general intellectual endowment. It has been previously pointed out that the effect of training or exercise as applied in these studies was highly specific to those activities in which the child received daily practice. Certainly, whatever are the factors measured by standardized intelligence tests, they have not been appreciably altered by the different experimental experiences to which the twins were subjected.

There is one aspect of mental development which deserves mention, although it has no direct bearing upon the training program. In parlor discourse the earliest individual memory is a common topic. Psychologists are usually skeptical of reports of direct memories of experiences which have occurred during infancy. The usual explanation is that the person had heard the experience referred to and therefore could not distinguish between direct and verbal memories of it. Because of the peculiar circumstances of the twins' first two years, it is possible to know precisely whether reference had been made to certain incidents in their early experiences. There are several instances in Johnny's

behavior indicating remote memory. When Johnny was sixteen and seventeen months old, he would skate through the tunnel joining Babies Hospital and Neurological Institute as he journeyed to the swimming pool in Bard Hall. These journeys through the tunnel were terminated when he was seventeen months old, and he never entered the tunnel again until he was 43 months old, i.e., twenty-six months later. On this occasion he was walking with three other children. As he entered the tunnel his eyes widened and he suddenly remarked, with a sweeping gesture, "This is where we go skating." This recall is interesting beyond the mere indication of memory for early experiences. At the time the tunnel journeys were ended Johnny had no verbal means of expressing the act of skating. He recognized skates by name, but he had no word in his own vocabulary to indicate them. Here his remote memory is entirely integrated with verbal expression which was acquired at a later date. A year later, when he was four and one-half years old, Johnny was again escorted to the tunnel. On this occasion he asked, "Where's the bathroom?" When told he would have to wait until he returned to the laboratory, he replied, "Oh, there's one way, way down there," pointing in the direction of Neurological Institute. It was then recalled that when Johnny was seventeen months old he was being trained in toilet habits, and as soon as he arrived at Neurological Institute during those days, he was rushed to the toilet. Another instance illustrates his incorporating into his vocabulary recollection of an experience which occurred before he had language facilities for expressing such experiences. Johnny and Jimmy were just two years old when they entered the elevator of an apartment house alone and Johnny pulled the lever, sending the elevator to the basement. The occasion was subsequently never referred to, and other persons who have been associated with the children did not even know about it. More than three and one-half years later, as Johnny sat somewhat meditatively watching the dial indicate the floors of the elevator in Babies Hospital, he quietly remarked, "Dr. McGraw, remember when Jimmy and me went in your house in the elevator and it went down boom!" These incidents are cited because they are comparable to citations of many parents in reporting the early memory of their children; and because of the peculiarity of experiences to which the twins were exposed during their first two years, it is possible to know definitely whether or not subsequent reference had been made to the situations. If the direct memory of experiences during the first two years of life are as indelible as these incidents indicate, then the weight attributed to influences imposed upon the infant and young child gains significance.

There is nothing of experimental significance in the physical history of the two children. Although Johnny was smaller during the first seven months of his life, he began at about eight months to maintain a superior weight gain as compared to that of Jimmy. This advantage in body weight he has sustained during the four years they have been at home. While Johnny began to show this superiority in weight gain about the same time as he showed improvement in motor performances, there is no claim of a direct relationship between the two. Their health records compare favorably with those of other children of their socio-economic level, and their value to this study is only in so far as they indicate no serious sequelae of their experimental experiences during their first two years of life.

SUMMARY

Studies of the performances of Johnny and Jimmy in particular laboratory situations indicate that the amount of retention of a motor performance, once the factor of repetition has been reduced or abandoned, is contingent upon the state of fixity the activity had attained at the time the practice-factor was withdrawn. Activities which have attained a high degree of integration may be

appreciably altered if the body mechanisms are so modified through growth as to introduce new structures or elements into the situation. The natural and gradual maturing of emotional or attitudinal factors seems to influence appreciably the somatic or motor performance in particular activities.

In general endowment the two children have consistently fallen within the normal range as measured by the standardized intelligence tests. There is no reason to believe that exercise in special activities will accelerate mental functions as measured on standardized scales. There seems to be a superiority of general muscular coordinations on the part of Johnny, who received the longer and more intensive practice in motor activities. In general personality make-up, Johnny also appears to be more complex as indicated both by psychiatric interviews and by analysis of responses to the Rorschach ink blots. There is no way to evaluate the extent to which their early experimental experiences operated in determining their respective personality components.

The two boys today present the picture of lively, normal six year old children who show no deleterious sequelae of the different regimes to which they were subjected during the first two years of their lives.

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THE GROWTH OF AN ABSTRACT CONCEPT

SINA M. MOTT[1]

It is the purpose of this study to present a summary of an investigation concerning the growth of concrete and abstract ideas.

HISTORICAL SURVEY

Clark (2), in his studies of children's drawings of an apple pierced by a pin, found that children six years and under demanded that the total part of the pin show as the pin did go through it. Rouma (10, 11) found the same obstinacy on the part of this younger group to portray what they knew to be there, and says that when he would stop them and ask them to look at the object they seemed annoyed and would only give it the required glance and then continue drawing the pin all the way through the apple. Kerschensteiner (4), Luquet (5) and Eng (3) all stress the fact that the child will draw the legs of a man and then put on the pants or the dress. If drawing a house they will show the objects in the house, "For there is a table, bed or chair." O'Shea (8) and Passy (9) tried posing themselves in different positions and found this fact to be true. Bühler (1) maintains that it is this knowledge which makes the child draw two arms, two legs, two eyes, but only one nose. This same factor is brought out more strongly by Luquet (5, 6) and Eng (3) in their studies of individual cases in which they heard the child say "No, she has two eyes, she has two ears, I will put them both here."

Because of this the drawings of children under eight years are of great value in the study of mental processes.

THE PROCEDURE

The drawings studied in this investigation were made by two different groups of children. The first, from one of New York's Public Schools, was composed of thirty-five children whose ages ranged from four years and seven months (the age of the youngest when the study was started) to six years and nine months (the age of the oldest when the study was concluded). The second, a group from Southern Illinois State Normal University Training School, was composed of twenty-three children whose ages ranged from five years and six months (the age of the youngest when the study was started) and seven years and six months (the age of the oldest when the study was completed).

The drawings were made every two weeks. Those of the man and the policeman (policeman for the first group, a farmer for the second) were made on the first, fifth, ninth, et cetera, weeks while that of the man and the cowboy came on the third, seventh, eleventh, et cetera weeks. The children were each provided with a sheet of paper 8½" x 11" and a soft lead pencil. They were told: Today we are going to draw a picture of a man. Draw the very best one that you can. Take all the time that you want. At the close of ten minutes the sheets were picked up and a second of the same size was given to them. This time they were told: Now we are going to draw a picture of a policeman you see standing on the street corner as you come into school. Draw the very best one that you can. Take all the time you wish. The next time the same procedure was followed except that the drawing of the man was followed by that of the cowboy. Thus the reader will note that the picture of the abstract idea came first in both instances. In the first instance it was followed by that of a type which they see

[1]*From the Southern Illinois State Normal University. The author wishes to acknowledge her indebtedness and appreciation to Miss Caroleen Billhartz for clerical and statistical aid.*

each day, in the second it was followed by a type which they had seen only occasionally or only by picture.

These drawings were thus collected over a period of six months. They were filed away until the last had come in making a total of 1212 drawings. Three people, two of whom did not know the purpose of the study, scored the drawings according to the Goodenough Drawing Scale. Representative drawings taken from four children were arranged on two large sheets and photostated.

THE FINDINGS

The findings are presented under two headings: data obtained by the scoring of the drawings and presentation of representative drawings. Under the first we have six factors which were found from these data:

1. The total number of drawings of the policeman, farmer, cowboy.
2. The number of times the score on the drawing of the man was more than the score on the picture of the farmer, policeman or cowboy which followed.
3. The number of times the score on the drawing of the man was equal to that of the farmer, policeman or cowboy.
4. The number of times in which the score on the picture of the man was less than the score on the picture of the farmer, policeman or cowboy which followed.
5. The total amount of the scores made on the drawing of the man which was over and above that of the policeman, farmer or cowboy which followed.
6. The total amount of the score made on the policeman, farmer or cowboy over and above that of the preceding man.

The tabulated findings appear in Tables 1 and 2.

TABLE 1

SCORES MADE ON THE DRAWINGS OF A MAN AS COMPARED WITH THAT OF THE POLICEMAN, THE FARMER, AND THE COWBOY

The number of times in which the score on the drawing of the man was	Group No. 1			Group No. 2			Total
	Policeman	Cowboy	Total	Farmer	Cowboy	Total	
1. Equal to that of the	45	27	72	41	29	70	142
2. More than that of	75	48	123	79	70	149	272
3. Less than that of	51	33	84	49	58	107	191
Total	171	108	279	169	157	326	605

TABLE 2

SCORES MADE ON THE DRAWING OF THE FARMER, THE POLICEMAN OR THE COWBOY OVER AND UNDER THE AMOUNT OF THE SCORE MADE ON THE DRAWING OF THE PRECEDING MAN

Total amount of scores that were	Group No. 1			Group No. 2			Total
	Policeman	Cowboy	Total	Farmer	Cowboy	Total	
Under that of the man	112	52	164	180	152	332	498
Over that of the man	163	101	264	97	137	234	498

The drawings appearing in Figures 1, 2 and 3 are those made by three different children in the Public School in New York. They were traced from the original sheets. They were then photostated, being reduced to one-fourth the size. The pictures occur in the order drawn: man (m), policeman (p), man (m), cowboy (c), man (m), policeman.

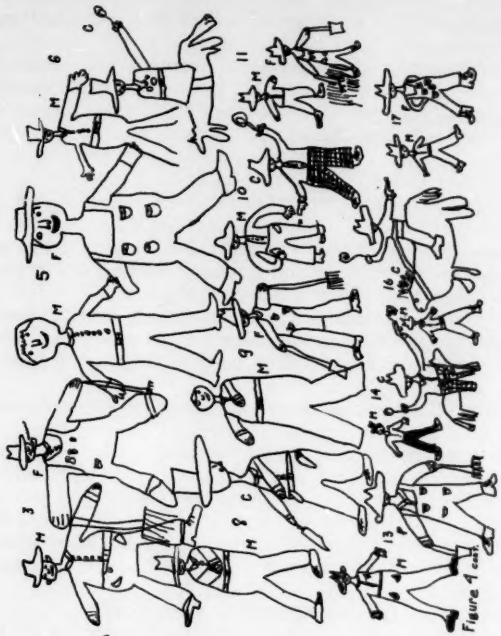

Figure 1 cont.

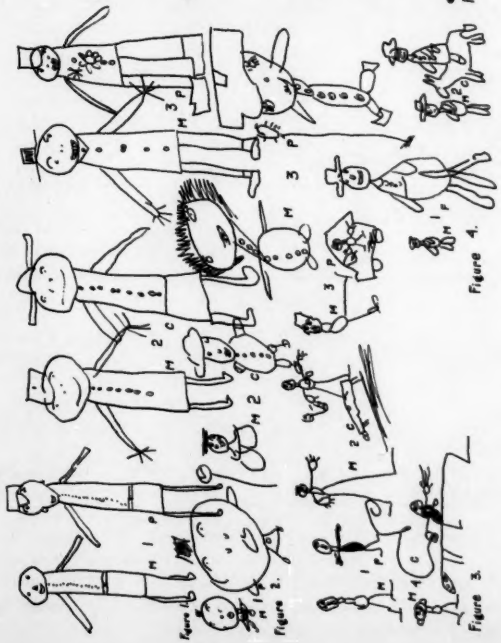

Figure 4.

Figure 3.

Figure 2.

Likewise Figure 4 contains the drawings made by one child (over a period of thirty-four weeks) in the Allyn Training School. In this instance the reader will note that drawings No. 4, 7, 15 are not present. This is due to the fact that the child was absent on the days when these particular drawings were made.

GENERAL DISCUSSION

According to the figures presented in Table 1, one out of five of the drawings of the man had the same score as the following object. Almost half of the pictures of the man had a higher score than did the following object. Only one out of three times does the drawing of the following object have a higher score than that of the preceding man. These things being true can it be said that inasmuch as the drawing of the man more often has a higher score, that the concept of the man is more complete? This would appear so were we only to consider the drawing of the man as it is to be scored by the Goodenough Drawing Scale. Before accepting the idea that the concept of the man is the more complete, one is confronted with two items:

1. Ninety-six per cent of the following objects have some identifying feature.
   a) For the policeman in order of frequency: cap, star, horse, police car, and the "Stop" and "Go" signs.
   b) For the farmer in order of frequency: rake, hoe, horse, plow and livestock.
   c) For the cowboy in order of frequency: hat, gun, rope and horse. (Of these items only the cap and hat are counted by the Goodenough Drawing Scale).
2. The child becoming interested in the identifying features forgets to complete the picture. A number of these illustrations are given in Table 3. It will be noted that the item in each instance is one which is listed on the Goodenough Drawing Scale.

TABLE 3

ITEMS OMITTED IN THE SECOND PICTURE

Figure	Drawing	Omitted Items
1	2 & 3	Fingers
2	3 & 7	Hair, Fingers
3	2 & 4	Hair, Ears
4	3, 5, 6, 14 & 17	Shoes, Hair, Legs, Hands

TABLE 4

ITEMS ADDED IN THE SECOND PICTURE

Figure	Drawing	Items added to the Policeman and Farmer	Drawing	Items added to the Cowboy
1	1 & 3	Cap, Star		
2	1 & 3	Cap, Stop & Go sign	2	Feet
3	3	Police wagon, Arms	2 & 4	Horse, Rope, Gun
4	1,3,5,9	Hoe, Rake, Overalls	2,6,8,10	Horse, Gun, Rope
	11,13,17	Hat, Grass	14,16	Knife, Checkered Pants

According to the information presented in Table 4:

1. There are fifty objects added to twenty-one pictures which is more than two to a picture. The proportion added to the policeman and farmer is a little

higher than that of the cowboy. This is true of the pictures as a whole, which would indicate that one builds a more complete picture when one sees the real object rather than a picture of that object.

2. Only four of the fifty objects added would have increased the score on the policeman or farmer.

3. The item added is distinctly characteristic of the type drawn.

4. There is more carry over from the concrete (policeman, farmer or cowboy) to the abstract drawn two weeks later than from the abstract to the following concrete drawn the same day. Illustrations: Cap (F.1,D.1), Hat (F.1,D.2), Hat (F.2,D.1) and Arms (F.3,D.1).

SUMMARY

A study of 1212 drawings made by six-year-old children reveals the following items of interest:

1. The number of times in which the score on the drawing of the man was more than that of the score on the policeman, farmer or cowboy has a proportion of three to two. However, the total amount of the score on the drawing of the man is equal to that of the policeman, cowboy and farmer.

2. Ninety-six per cent of the drawings of the policeman, farmer and cowboy have some identifying features which are characteristic of them. Only a very few of these features are listed in the Goodenough Drawing Scale.

3. There exists a greater carry over of items added from the concrete to the abstract, than from the abstract to the concrete. There also exists more identifying objects for the concrete character (Policeman, Farmer) seen in reality than for the (Cowboy), knowledge of which is gained largely from pictures.

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OBSERVATIONS ON ESTIMATING SKELETAL AGE FROM THE TODD AND THE FLORY BONE ATLASES

S. IDELL PYLE AND CAMILLE MENINO[1]

The recent publication of Charles D. Flory's monograph on osseous development in the hand (2) and of T. Wingate Todd's Atlas of Skeletal Maturation (hand) (1) brought attention again to the research which has been done on the problem of estimating bone growth from roentgenograms. Flory's monograph appeared first, but as he points out on page 54, the general scheme for assessing skeletal age used by both authors was initiated chiefly by Todd, and his reports preliminary to the publication of his atlas stimulated the work done by Flory.

Both authors discuss at some length the effectiveness of the bone measurements in current use. Flory reviewed a number of so-called anatomic indices, which have been based on changes in carpal areas and diameters, and compared his skeletal-months ratings with some of the most reliable indices by which his group of children had been rated previously. He demonstrated that a skeletal-month rating is as good a method of estimating growth as any other method proposed, and is much superior to measurements used during the adolescent years (page 103). Todd and his collaborators have expressed the same opinion in all their studies although the point was not discussed at much length in the atlas itself (page 15).

The inspectional method is unique in one feature, - it fixes one's attention on the directions in which growth is proceeding. Bone form and bone size demonstrate different growth phenomena, and a measurement of direction of growth, increase in size and status of mineralization are difficult to combine into a single expression, yet all three are necessary for adequate judgment of growth in the living bone. Skeletal age assessments done according to the method of Todd and Flory are intended to express the principles underlying the three points.

Todd's and Flory's illustrations show that delineation of articular surfaces actually begins during the first six postnatal months. Nuclei of ossification in normal epiphyses are probably centered with respect to functional forces when the first mineral deposits are made in the cartilage. Marginal changes in the calcifying nucleus demonstrate the degree of maturity and, therefore, quite early hint at ultimate size. It is well known that two healthy children of the same sex can differ several months in age and yet have epiphyseal nuclei of the same dimensions. The contour, however, aids in deciding whether one is dealing with a normal or retarded bone, destined to be large or small.

At this stage in bone studies it is not clear what the maturational features of bone texture are as seen in roentgenograms. Both Todd and Flory attach legends to their x-ray photographs in which Todd, in particular, refers to the significant changes in form at certain of the bone margins which indicate degree of maturation and he classified the bone texture of each illustration. However, neither author demonstrated the range of variation in form and in texture which one may expect to find.

The two atlases differ in several respects in describing the rate at which bone growth takes place in the hand of the average child. It has been of interest to us, therefore, to compare skeletal ages obtained by using both atlases simultaneously for the same group of children. This paper is a comparison of the skeletal age assessments for the Fels Research Institute children rated first by the Flory and then by the Todd atlas.

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Both of us are somewhat familiar with Todd's method of appraisal, one as a visitor to his laboratory for several months when he was beginning the work on the atlas, and the other as a student in his classes after the atlas was completed. Neither of us wishes to imply that Dr. Todd is in any way responsible for the interpretations which are made in this study. Neither rater has had the privilege of any contact with Dr. Flory and the ratings are, therefore, wholly an interpretation from the descriptions in his monograph.

METHOD OF USING THE ATLASES

The assessments were started and completed for every age group without discussing in detail the method of rating to be used by each of us. A brief preliminary agreement was made between us about the form to be used in recording the assessments and these notations were printed on 3 x 5 cards. The following is a sample rating:

Child's Name---------- Age 1-0-1

	Todd	Flory
Metacarpals: shafts	< 12 mo.	> 12 mo.
bases	< 12 "	> 12 "
Phalanges: prox.	< 12 "	> 12 "
middle	< 12 "	> 12 "
distal	> 12 "	> 12 "
Carpals	> 6 "	< 12 "
Radius	9 "	< 12 "
Ulna	9 "	12 "
No. of ossification centers	same as 12 mos. average; plus distal 3	Same as 12 mos. average, plus met. 2, 3; middle 4 distal 1, 3, 4

From such detailed notes the skeletal age rating was summarized on the back of the card, together with a rating for texture. (The method used in recording notes on texture is omitted here because it is part of another study.)

The photograph in the atlas corresponding most closely to the child's chronological age was propped up before us beside the child's x-ray. This illustration was inspected first. Assessments were always made from Flory's atlas first for the entire group. In using the card to record the assessment made according to Todd's atlas, the Flory notes were covered up so as to make the judgments as independent as possible. For the children up to a year of age the symbols $>$ and $<$ were used throughout to show which photograph the child's x-ray resembled most closely. Thus a rating of $>$ 3 months was summarized as 3.3 months and a rating of $<$ 4 months as 3.6. This is clearly an over-refinement of the atlases. It does aid in classifying the judgment of individual differences in different parts of the hand, and is useful in calculating averages.

When the assessments were finished it was found that about 5 per cent of our ratings differed more than seemed reasonable. All ratings were repeated independently once more if they differed by more than one month for children under a year of age, by more than three months in the rest of the group. Between sixty and seventy x-rays were re-assessed, and about forty of them were changed to the second rating. Aside from this procedure, the skeletal ages given here are first decision assessments made without any reference to the skeletal age

assigned to the child at a preceding age level.

All the x-rays used were taken within six days of the monthly birthday date.

CHILDREN INCLUDED IN THE STUDY

Seven hundred and ten x-rays of 72 girls and 79 boys from 3 to 60 months inclusive were used. There was a minimum of two x-rays for each child. Seventeen children had had to complete series of x-rays at every age level.

An idea of the general economic and social status of the children is shown in Table 1.

TABLE 1

PERCENTAGE DISTRIBUTION OF CHILDREN STUDIED ACCORDING TO THE MINNESOTA OCCUPATION SCALE OF MALE PARENT AS COMPARED WITH U.S. AND OHIO 1930 DATA

Group	Fels Group Present Group	1932-1938 Original Group	U.S. (1930)	Ohio (1930)
I. Professional	17.05	19.32	2.59	3.25
II. Semi-professional and managerial	19.38	17.04	7.22	5.68
III. Clerical, skilled trades and retail business	17.83	13.63	13.81	18.03
IV. Farmer -- Owners	15.50	23.86	15.42	9.84
-- Renters	7.75			
V. Semi-skilled, minor Clerical, minor business	14.73	16.47	23.74	36.17
VI. Slightly skilled trades, other occupations requiring little training or ability	2.33	2.84	14.47	8.89
VII. Day laborers of all classes	5.43	6.82	22.63	18.97
Total (per cent)	100.00	100.00	100.00	100.00

The selection of the children comprising the group is made in each instance from four to seven months before birth. Repeated observation has shown that the group's economic distribution is better than average. There have been no major factors operative which could have prevented the group from being from a representative sampling tending toward superior economic status. None of our colored children were included.

FINDINGS

OBSERVERS' AGREEMENT IN RATING

Skeletal age ratings for 75 boys and girls who were thirty-six months old were selected by random sampling to see how nearly we agreed in skeletal age assessment. Product-moment correlations were calculated and are compared in Table 2 with those of Todd and Flory.

TABLE 2

	r	P.E.$_r$
Menino and Pyle assessments using Todd's Atlas	+.97	±.01
" " " " " Flory's "	+.88	±.03
Todd and Frances " on Cleveland children	+.95	±.02
" " Bayley " " " "	+.73	±.05
Frances and Bayley " " " "	+.72	±.05
Flory's duplication of his own assessments at 7 yrs.	+.97	±.01
First student and Flory	+.93	±.01
Second student and Flory	+.92	±.02
Third student and Flory	+.90	±.02

Flory states that for skeletal-months ratings correlation coefficients from .87 to .97 are sufficiently consistent to be trusted. The correlations between our ratings at any age level fell within this range, and we tended always to rate more nearly alike when using the Todd atlas. We interpreted this better agreement when using the Todd Atlas in part to the practice gotten from using the Flory atlas first and in part to the advantage one gets from having illustrations for every six months instead of once a year. It seemed to us that the yearly interval illustrations are spaced too far apart at these age levels. Finer gradations of change are detectable and useful in clinical practice.

ASSESSORS' PRECISION IN USING THE TWO SCALES

A correlation between the Todd and Flory ratings which each of us made for 50 of the three-year-old boys and girls was next calculated. The results were:

	r
Menino's ratings by the Todd and Flory standards	+.87 ±.03
Pyle's ratings by the Todd and Flory standards	+.87 ±.03

This again was an unselected sampling of the cases.

RELATION BETWEEN NUMBER OF OSSIFICATION CENTERS AND SKELETAL AGE RATINGS

There has been a great deal of discussion about the influence of the number of ossification centers upon a skeletal age rating. Both Todd and Flory believe that bone growth cannot be estimated adequately from number of ossification centers alone. Failure of ossification centers to appear, however, aids in diagnosing retarded growth. By thirty-six months both Todd and Flory state that all the ossification nuclei for the heads of the metacarpals, phalanges, and the radius should have made their initial appearance. It should follow, therefore, that the influence of the number of epiphyseal centers on the skeletal age ratings should be well seen at twelve and twenty-four months, since the majority of the metacarpal and phalangeal nuclei appear between these ages.

Fifty twelve month-old girls were selected by random sampling and a correlation was made between skeletal age and number of ossification centers. The same group of girls with six substitutions were studied at twenty-four months. The skeletal age ratings used were those made by Pyle.

At twelve months	r
S. A. (according to Todd) and No. of ossification centers	+.82
S. A. (according to Flory) " " " " "	+.72
Todd S. A. and Flory S. A.	+.91
Todd S. A. and Flory S. A. with No. of ossification centers held constant	+.81

At twenty-four months	r
S. A. according to Todd's atlas and No. of ossification centers	+.67
S. A. according to Flory's " " " " " "	+.83
Todd and Flory S. A.	+.90
Todd and Flory S. A. with No. of ossification centers held constant	+.83

The correlation between assessments where the number of ossification centers was held constant did not differ at the two age levels. At twenty-four months the number of ossification centers correlated less closely with the ratings made according to the Todd atlas and were, therefore, affected slightly less by

TABLE 3

SKELETAL AGE RANGE OF FELS RESEARCH INSTITUTE CHILDREN ESTIMATED ACCORDING TO TODD'S AND FLORY'S ATLASES BY TWO OBSERVERS

BOYS

M = Menino P = Pyle

	Number of children in each chronological age group (Rated according to Todd)								12 months group (Rated according to Flory)	
	3 months		6 months		9 months		12 months			
Observers	M	P	M	P	M	P	M	P	M	P
S.A.										
± 2 Mo.	9	16								
± 3 Mo.	23	10								
± 4 Mo.	1	6	5	4						
± 5 Mo.		1	22	16		1				
± 6 Mo.			22	18	2	5				
± 7 Mo.			2	12	15	7		1		
± 8 Mo.			1	1	9	15	6	5		
± 9 Mo.				1	10	8	8	6		4
± 10 Mo.					1	4	17	10	7	8
± 11 Mo.					3	1	10	13	13	8
± 12 Mo.					1	2	6	10	20	14
± 13 Mo.					1		1	2	3	5
± 14 Mo.					1		2	1	3	2
± 15 Mo.							1	2	2	6
± 16 Mo.										2
± 17 Mo.									2	1
± 18 Mo.										
Average S. A.	2.8	2.9	5.6	6.0	8.4	8.4	10.5	10.9	12.0	12.1
No. of children	33		52		43		50		50	
No. rated alike by (M) & (P)	16		17		15		7		13	
No. rated as less than 1 Mo. apart	23		24		28		27		13	
No. rated as less than 2 Mos. apart	32		48		41		46		33	

number of centers after the epiphyseal shape began to be differentiated.

DISCUSSION OF SKELETAL AGE DISTRIBUTIONS

Tables 3 to 6 show the amount of variation in the skeletal age ratings for the Fels Institute children.

During the first year the girls varied less than the boys except at three months. Both raters judged both the boys and the girls to be below the Todd standard as a group at every age level up to five years of age. Our assessments made according to Flory's atlas were higher than the assessments made according to Todd for both the boys and the girls at every age except for the twenty-four-month boys.

The Fels Institute group is continuously less advanced than the standards constructed for the Cleveland and Chicago groups. To be sure, Todd and Flory each point out that as much as six months variation from a standard after a year of age indicates neither serious retardation nor acceleration, but when the

TABLE 4

SKELETAL AGE RANGE OF FELS RESEARCH INSTITUTE CHILDREN ESTIMATED ACCORDING TO TODD'S AND FLORY'S ATLASES BY TWO OBSERVERS

GIRLS

M = Menino P = Pyle

	Number of children in each chronological age group (Rated according to Todd)								12 months group (Rated according to Flory)	
	3 months		6 months		9 months		12 months			
Observers	M	P	M	P	M	P	M	P	M	P
S. A.										
± 1 Mo.	1	3								
± 2 Mo.	11	21								
± 3 Mo.	14	7		1						
± 4 Mo.	5	2	13	5						
± 5 Mo.	3	1	22	31	1	1				
± 6 Mo.			13	11	5	3	1			1
± 7 Mo.				1	17	15	3	4		
± 8 Mo.			1		12	19	8	12		
± 9 Mo.					7	4	11	8	2	1
± 10 Mo.					1	1	12	6	10	6
± 11 Mo.							4	10	10	11
± 12 Mo.							3	3	11	9
± 13 Mo.							2	1	5	4
± 14 Mo.									2	1
± 15 Mo.									2	9
± 16 Mo.										
± 17 Mo.										
± 18 Mo.									1	2
± 19 Mo.									1	
Average S. A.	3.0	2.4	5.2	5.3	7.7	7.7	9.6	9.6	11.8	12.3
No. of children	34		49		43		44		44	
No. rated alike by (M) & (P)	13		16		14		17		17	
No. rated as less than 1 Mo. apart	22		33		33		40		17	
No. rated as less than 2 Mos. apart	33		49		43		42		35	

trend is constantly below the mean trend of both atlases, as it is in this case, a slower rate of development is suggested. Todd does not give the mean skeletal age for his group. On page 96, Flory shows that the mean skeletal age for the Chicago children tends to exceed the chronological age a little up to five years of age except for the two-year-old girls. His means and the means obtained for the Fels group are as follows:

Age in years	1	2	3	4	5
Boys					
Flory's mean	12.8 Mo.	25.1 Mo.	36.9 Mo.	50.1 Mo.	62.0 Mo.
Menino's mean	12.0	20 -	34 +	45 -	57 +
Pyle's mean	12.1	21 +	34.0	45 -	57 +
Girls					
Flory's mean	12.2	24.0	35.1	48.4	60.2
Menino's mean	11.8	22 +	34 +	46.0	58 -
Pyle's mean	12.3	23 +	35 +	47 -	58 +

PYLE AND MENINO: ESTIMATING SKELETAL AGE

TABLE 5

SKELETAL AGE RANGE OF FELS RESEARCH INSTITUTE CHILDREN ESTIMATED ACCORDING TO TODD'S AND FLORY'S ATLASES BY TWO OBSERVERS

BOYS

M = Menino P = Pyle

Number of Children in each Chronological Age Group

	24 months				36 months				48 months				60 months			
Atlas Used	Todd		Flory		Todd		Flory		Todd		Flory		Todd		Flory	
Observers	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P
S. A.																
10 Mo.			1*													
11 Mo.				1*												
12 Mo.	1															
13 Mo.		1														
14 Mo.	1	1	2	1												
15 Mo.	2	1	1	4												
16 Mo.		1		1												
17 Mo.	2	1	1													
18 Mo.	5	7	11	6	1*	1*	1*									
19 Mo.	2		3													
20 Mo.	6	6	9			1*		1*								
21 Mo.	1	1	2	9	1*		1*	3*								
22 Mo.	4	2	4	4			2*									
23 Mo.	4	3		7	1*											
24 Mo.	1	7	6	5	1	1										
25 Mo.	2	1	1													
26 Mo.	4	3														
27 Mo.	1	3		1	1	3										
28 Mo.	2					1	1									
29 Mo.	3															
30 Mo.		3		2	2	4	2	4		1*		1*				
31 Mo.						2			1*							
32 Mo.			1		8	4	4	1	3*							
33 Mo.	1	1		1	3	3	2	8		2*	2*	2*				
34 Mo.					2	1	3	1			2*					
35 Mo.					3	1	1	2				1				
36 Mo.					2	5	8	5								
37 Mo.					2						2					
38 Mo.							3		1							
39 Mo.					2	4	2	5	1	6		1		1*	1*	1*
40 Mo.					1	1	1		1						1*	
41 Mo.					3				1		2		1*			
42 Mo.						1	1	3		3	1	6	3*	3*	1*	2*
43 Mo.											1					
44 Mo.							3		4		2				2*	1*
45 Mo.					1	1		2	1	4	2					1*
46 Mo.									2	1	3	2				
47 Mo.									2			2				
48 Mo.									3	5	1	2				
49 Mo.									2		1		2			
50 Mo.													2		1	
51 Mo.					1*				2	2		5		2		2
52 Mo.															1	
53 Mo.											1		2		2	
54 Mo.						1*				1	3	3	2	3	1	2
55 Mo.																
56 Mo.									1		1		1	2	1	
57 Mo.											1			1		3
58 Mo.															1	1
59 Mo.													1		1	2
60 Mo.													2	4	3	4
61 Mo.															1	
62 Mo.													1		1	
63 Mo.													4	3	2	2
64 Mo.													1		1	
65 Mo.																
66 Mo.													1	2	2	1
67 Mo.																
68 Mo.													1	1		3
69 Mo.															2	
70 Mo.													1			
71 Mo.													1	1	2	2
72 Mo.																
73 Mo.																
74 Mo.																
75 Mo.																
76 Mo.													1*			
77 Mo.														1*		
78 Mo.																

* Omitted in calculating the selected skeletal age averages for each group

Number of Children	42				35				25				27			
Selected S. A. Av.	22-	22+	20-	21+	34-	34+	36-	36-	44-	45-	47-	47-	60+	59+	61+	60+
Average S. A. for entire group	22-	22+	20-	21+	34-	33+	34+	34	44-	43+	45-	45+	57+	56+	57+	57+
No. rated alike by M and P	10		6		8		5		5		2		5		7	
No. rated alike ±1 month	25		20		19		18		12		13		14		12	
No. rated alike ±2 months	40		34		28		24		20		13		21		19	

TABLE 6

SKELETAL AGE RANGE OF FELS RESEARCH INSTITUTE CHILDREN ESTIMATED ACCORDING TO TODD'S AND FLORY'S ATLASES BY TWO OBSERVERS

GIRLS

M = Menino P = Pyle

Number of Children in each Chronological Age Group

	24 months				36 months				48 months				60 months			
Atlas Used	Todd		Flory		Todd		Flory		Todd		Flory		Todd		Flory	
Observers	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P
S. A.																
10 Mo.	1*	1*														
11 Mo.		1														
12 Mo.	2	1														
13 Mo.		1	1	2												
14 Mo.		1		1												
15 Mo.		4														
16 Mo.	2	1	3													
17 Mo.		2	1													
18 Mo.	3	6	2	4												
19 Mo.	5	2														
20 Mo.	6	2	13			1*										
21 Mo.	4	1	1	7												
22 Mo.	2	1	2	3												
23 Mo.	1	1		5	1*		1*									
24 Mo.	5	11	10	6		2										
25 Mo.	5	2	1	5	1											
26 Mo.	4	2	3				1									
27 Mo.		3		5	2	2		2								
28 Mo.			3	1	1	1										
29 Mo.					2											
30 Mo.		2		2	2	6	4	4								
31 Mo.					2		2									
32 Mo.			1		5	2	6									
33 Mo.					4	6	4	11		1*						
34 Mo.				1	3	3	1	3								
35 Mo.					2		3	1								
36 Mo.					2	3	3	5	1*	2						
37 Mo.					1				1							
38 Mo.					1					1						
39 Mo.				1*	1	3	2	2	2	5		3				
40 Mo.							3		1	2	1					
41 Mo.						1			2							
42 Mo.						1	1	3	3	3	8	3			1*	1*
43 Mo.									2		1				1*	
44 Mo.					1		1			2	2	1				
45 Mo.					1	2		2	3	2	2	5				1*
46 Mo.					1					1	2	3				
47 Mo.	1*	1*							1							
48 Mo.							1*		4	4	4	5		1		
49 Mo.									4							
50 Mo.									2							
51 Mo.										1						
52 Mo.										2		2	2	3		1
53 Mo.													2		1	
54 Mo.									1			2		8		3
55 Mo.									1				4		1	
56 Mo.													1	1	2	
57 Mo.											1	1	3	2	1	4
58 Mo.									1		2		3		8	3
59 Mo.																1
60 Mo.						1*		1*						6	1	4
61 Mo.													3	1	1	
62 Mo.													1		2	1
63 Mo.															1	3
64 Mo.														1		
65 Mo.													2	1		3
66 Mo.																
67 Mo.																
68 Mo.													1	3		
69 Mo.															1	1
70 Mo.													1			
71 Mo.														1		
72 Mo.																

* Omitted in calculating the selected skeletal age averages for each group

Number of Children	43				33				26				27			
Selected S. A. Av.	22-	21-	22+	23+	33+	33+	34+	35+	45-	43+	46	46+	58+	57+	59	59+
Average S. A. for entire group	22	21	22+	23+	33+	33+	34+	35+	45-	44-	46	47-	57-	56-	58-	58+
No. rated alike by M and P	6		7		4		5		5		6		3		3	
No. rated alike ±1 month	22		21		25		15		12		14		12		13	
No. rated alike ±2 months	33		30		31		20		19		14		19		16	

Flory's averages for boys exceed the Fels Institute averages more than his averages for girls. By four years of age Fels Research Institute average differed as much as five months from the Chicago average. Flory states that the greatest deviation obtained by him for any sampling of fifty roentgenograms was less than four months and that he got both positive and negative deviations. In contrast, the Fels Institute children were always skewed toward less maturity and the five months difference, therefore, has some significance.

It was pointed out before that at twenty-four months the ratings for boys made according to the Todd atlas exceeded the ratings made according to Flory. This reversal was the most outstanding difference found between the atlases. It is particularly significant because the Flory skeletal-months mean was 25.1 months, suggesting that his standard may have been chosen from a group of accelerated bone x-rays.

SUMMARY

Skeletal age assessments for 710 x-rays of 151 average type of American children taken at three or six-month intervals from birth to five years of age inclusive were made according to the Todd and the Flory bone atlases simultaneously. The results showed:

(a) Skeletal age ratings made according to the Todd atlas indicated that the Fels Institute children were more delayed in bone growth than when they were rated according to the Flory atlas.

(b) The children as a group were always consistently less mature in skeletal age than either standard, but less than five per cent of the children are retarded enough to suggest significant delay in their bone development.

(c) The Fels Institute children increased in skeletal age at as uniform a rate as did the group studied by Flory. Todd gives no averages. The findings suggest, since the Fels Institute children are delayed but not significantly more variable, that both standards are somewhat high for the Fels Institute children.

(d) Todd's atlas constructed on the basis of a maximum of six-month intervals seemed to us to be clearly advantageous for skeletal age assessments at all age levels below six years of age.

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THE INTERPRETATION OF SCHIZOPHRENIC-LIKE BEHAVIOR IN CHILDREN[1]

MANDEL SHERMAN[2]

It is well known that the recognition of mental abnormality in adults in the early stages is extremely difficult. And it is much more difficult to make a diagnosis of mental disease in children. The criteria of juvenile mental abnormality are ill-defined, and relatively few systematic studies have been made. The problem has been made additionally difficult by the indiscriminate use of the term "behavior problem." In general there have been few attempts to construct classifications of juvenile behavior, except in very broad categories. Most workers in the fields of child development and psychiatry have been content to classify behavior into the rather indefinite categories of "adjustment" and "maladjustment." It is obvious that such general classifications are inadequate. They may have a practical value from the standpoint of parent counselling, but exact treatment requires clear-cut differentiation. Greene (2) has shown, for example, that schizophrenic symptoms and the behavior of the mentally defective have been confused in many instances, in part because precise descriptive differentiation was not attempted. Others have noted that many symptoms of mental abnormality are overlooked until the behavior of the child becomes unusually deviant or queer.

In this paper the attempt is made to define and describe schizophrenic conditions of children. The data were obtained from examination and observation of seventeen children who were under study for periods of from six months to four years. It is not meant to imply that their symptoms were manifested in the same way as those of adult schizophrenics. The term juvenile schizophrenia is employed in this instance to describe a process of emotional disorganization and personality dissociation, in which serious judgmental defect was the most prominent symptom. The disorientation, the social deterioration and behavior disturbances, with or without hallucinatory, paranoid, or catatonic episodes, were considered to be symptoms of an abnormal process which might well be classified as schizophrenic. It is obvious to anyone with extensive psychiatric experience that it is extremely difficult to define early schizophrenia. The clinical picture of schizophrenia is so variable and the patterns of the various symptoms so indefinite, that most psychiatrists depend to some extent upon a social history in making their diagnoses. It is especially difficult to define a schizophrenic condition in its developmental stages. When an individual shows systematized delusions, hallucinations, paranoid ideas, ideas of reference or catatonic episodes, it is relatively easy to make a diagnosis; but when none of these circumscribed symptoms is present, the diagnosis is often not made until relatively late in the development of the condition. In general, psychiatrists probably agree in defining schizophrenia as a personality disorganization with more or less dissociation and affective disturbances. Whatever abnormal behavior may result from this condition depends at least in part upon the personality, attitudes, interests, and the experiences of the individual and the influence of his environment.

It is obviously much less difficult to recognize and define mental abnormalities when they occur in adults than in children. Children's behavior problems are often so severe that they resemble, in one way or another, various mental abnormalities. Some forms of behavior, which in children cannot be classified as behavior problems, are frequently prima-facie evidence of mental abnormality when they occur in adults. Because so many queer patterns of be-

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[2] *From University of Chicago.*

havior may occur in children as temporary expressions of personal problems and conflicts, psychiatrists have hesitated to make diagnoses of mental abnormalities. Nevertheless, mental abnormalities do exist in children, and perhaps to a greater extent than is generally believed.

Most psychiatrists believe that schizophrenia rarely occurs before adolescence, but a number of recent reports have shown that it not infrequently occurs before the age of seven. Lurie (4) found that two per cent of a series of one thousand problem children were psychotic. Thirteen of these children were classified as schizophrenic. Kasanin and Kaufman (3) reported that out of a total of six thousand patients admitted to the Boston Psychopathic Hospital between 1923 and 1925, one-hundred sixty were under sixteen. Sixty-five of these were classified as psychotic, and of this group twenty-one were diagnosed as schizophrenic. Greene (2, p. 137) reported that he found symptoms pointed to a psychotic condition in 349 of 1,488 children who came to the outpatient clinic of the Fernald State School.

It is important to differentiate between the symptoms of the psychotic child and those of the so-called pre-psychotic personality of young adults. Some psychiatrists believe that a specific pre-psychotic personality exists as a forerunner of a later psychosis. Bowman (1) studied the early personality characteristics of psychotic individuals. He utilized the interview method, consulting relatives and friends of hospitalized adult patients. He compared the findings with data on a normal control group. He reported that the pre-psychotic child, regardless of the type of psychosis he develops later on, tends to be a model child. He has few friends, indulges in solitary amusement, tends to be close-mouthed and uncommunicative, is self-assertive, and has less initiative than the normal. Others have also reported that the majority of psychotic patients were withdrawn types during their childhood. The evidence from the present study shows, however, that there is probably little relationship between the items of behavior of the so-called pre-psychotic personality traits and the behavior of children who show schizophrenic-like symptoms.

The behavior of the seventeen children who are reported in this study showed many differences. A number of common characteristics were found, however. In general, these children were found to have normal intelligence, and showed neither deceleration nor deterioration in their mental development. In every case but one, school difficulties were reported. Most of them did poor school work in spite of their good intelligence, and their scholastic achievement gradually became poorer. The majority of these children were seclusive and thus had few friends. The parents of several children attempted to stimulate them to be more friendly. They were unsuccessful, principally because their children complained that other children abused them or found no interest in them. In more than half of the cases, the parents and teachers reported that they had difficulty in handling the children because they could not predict their behavior. These children were inconsistent, aggressive in some instances, and shy and retiring in others. They were emotionally labile, and a situation which caused them to be happy and contented on one occasion produced the exact opposite on another. One of the most prominent of the early symptoms was poor judgment. The parents reported that the children often behaved on an infantile level.

Twelve out of the seventeen children showed excellent verbal ability.[3] The school teachers invariably reported that their recitations were frequently excellent, but that they did poor work otherwise. In spite of their good verbal ability, nine of the seventeen children showed linguistic disturbances, illustrated in frequent irrelevant statements and time and place disorientations.

[3] *The good verbal ability of schizophrenic children has been previously reported by Piotrowski (5).*

They also showed varying degrees of mental blocking, illustrated in their inability to follow directions clearly, frequent daydreaming in otherwise active situations, and their inability to respond verbally at times. Some of these children showed compulsive behavior which made adjustment to a social or school situation difficult. One of the interesting peculiarities of several of the older children was their unusual attention to and creation of detail. For example, they spent a great deal of time in making meticulous though bizarre drawings to illustrate some idea that they wanted to convey to others. In some instances these drawings illustrated new inventions, in others a long story which, according to them, would otherwise require a large manuscript.

EARLY PROBLEMS

The majority of the children were referred to the Orthogenic School because of their increasing behavior difficulties in school and at home. The parents of nine children complained of their disobedience and their failure to cooperate in the usual behavior pattern of the family. The parents of ten children complained that they were becoming increasingly seclusive. The result was that they stayed in the house most of the time and in some instances were considered queer by relatives and friends. The parents of four children stated that they quarrelled frequently.

The following list of problems reported by the parents of a boy of nine are given as illustrative of the difficulties of these children:

Has become increasingly seclusive and prefers to read rather than to play. Is forgetful and has become unreliable in carrying out directions.
Considerable daydreaming, also reported by the teacher.
Self-consciousness in the presence of strangers.
Verbalizes anxiety about his physical condition.
Mannerisms have made parents self-conscious about the boy. They report that he suddenly arises from his chair to walk out of the room when in conversation, and suddenly comes back. Also has many peculiar gestures of his hands.

The following are the problems reported by the parents of a boy of fourteen. They stated that these problems began when he was eight:

Increasing lack of concentration.
Nervous and jumpy.
Has no friends and takes part in few, if any, physical activities.
Stays in house and wants to be known as a good boy.
Talkative, but frequently talked about topics other than those which were being discussed.
Has not been accepted by other children who call him "queer" and "crazy."

In the case of a girl of thirteen, the parents first recognized her as unusual at the age of seven when she began to have violent temper tantrums and was abusive to other children. Her restlessness, irritability, and irresponsibility increased until at the age of thirteen they could no longer cope with her irritable and destructive behavior.

PHYSICAL FINDINGS

No common physical defects were found. The group as a whole was found to be below average in physical development. In two instances, there was evidence of a disturbance of the function of the autonomic nervous system. One boy of thirteen was found to have irregular pupils, an excessive amount of sweating of

the palms and an undue reaction of the vascular system to subliminal amounts of adrenalin. The laboratory findings were negative, except for a basal metabolic rating of from -18 to -22. Nine of the children were hyperactive and on examination showed muscular hypertonicity.

INTELLIGENCE

Except for two instances, the children were intellectually average or superior. Intelligence test records for nine children were available over a period of six years. On the individual intelligence tests the majority of the children showed a scatter which was considered abnormal. On the Stanford-Binet examination several children showed a scatter of eight years. In the case of a fourteen-year-old child with an I. Q. of 90, there was a scatter from the six-year-old level to the fourteenth. In the case of another boy of fourteen, the scatter was from a basal age of ten to the adult range. No definite pattern was involved in this scatter. Repeated tests showed that the scatter differed on different occasions, although the final mental age differed very little. In other words, a boy of twelve might show a scatter from the six to the fourteen-year level and an I. Q. of 95 and on the next test show a scatter from the eight to sixteen-year level with a similar I. Q. Psychologists generally consider such scatter on an intelligence test to be indicative of some emotional disturbance which interferes with the child's performance. (Some psychologists believe that test scatter indicates intellectual deterioration, but this belief was not substantiated by this study.) An interesting phase of the scatter was that a child was frequently able to pass all the tests in the eight-year level although they failed in one or more tests in the six-year level. This might indicate a disorganization, the basis of which is not intellectual disability but emotional interference. This disorganization may very well account for their poor school work, their lack of consistent motivation, and their failure to show adequate academic initiative.

Every child rated lower on self-administrative tests than on the Stanford-Binet. This was probably due to their inability to carry on a task without constant stimulation. Their attention was inconstant, and it was necessary to remind them to go on. The time element involved of most of these tests probably accounted in part for their low scores. In the Stanford-Binet there is constant supervision and direction and this test also is likely to give a child more credit for verbal ability. Ten of the seventeen children were superior to their general level of intelligence in their verbal ability in spite of their inability to perform tasks consistently. There is a possibility that their introspective activity and their social isolation gives them more practice in verbalization than the average child has who is active and therefore does not have the opportunity to verbalize as much.

One of the most significant differences between these children and normal children is their poor judgment. On specific tests involving judgment they performed as well as their general intelligence allowed. In practical social situations, however, they frequently behaved on a much lower level and sometimes in a way which observers considered queer. As an example of the disorganized judgment, one boy of ten, who was given two five-placed numbers to add, began to multiply the two numbers, then divided the two, and finally added. Another boy of twelve, who had normal intelligence was working on a problem of the growth of a child. The teacher told him to solve the problem of how tall a child of fourteen would be if he grew two inches every year from the time he was six, being four feet tall at that age. His answer was twelve feet, and in spite of explanations by the teacher regarding the average height of a child of fourteen, he was unable to understand his error. On several occasions, a boy of fourteen visited one of the staff members at his home at midnight or later. When his

attention was called to the lateness of the hour, he stated that he realized the lateness of the hour but thought that everyone would be at leisure at that time and so took advantage of the opportunity. Although such behavior is obviously abnormal, it is, in one sense, a result of poor judgment.

The problem arises of whether judgment cannot be classified under two categories - intellectual judgment in which reasoning is predominant, and affective judgment in which emotional orientation plays a leading role. If judgment may be defined as a rational decision, the elements of intelligence and emotions are inevitably involved. As stated previously, these children were able to pass tests involving judgment, that is, involving the solution of non-personal problems. When a practical situation arose which involved emotional integration as well as reasoning, these children were likely to fail. Their emotional disorientation probably accounted for these failures. It is probable that many infantile reactions of adults, which are classified as abnormalities, should be reclassified as poor affective judgment as a result of a partial or temporary dissociation between intellectual and affective judgment.

EMOTIONAL BEHAVIOR

The emotional behavior of these children may be generally grouped into two types: the emotionally indifferent, and the emotionally disorganized. Four of the children were characterized by staff members, who observed them over a long period, as quiet, unassuming, somewhat indifferent, and emotionally unreactive. In frustrating situations they tended to retreat and when disturbed by other children took refuge in the protection of adults. Their emotional indifference caused other children to regard them as queer because they did not respond with the enthusiasm or action that was expected of them. For the same reason it was impossible to motivate them to talk about any new situations. Neither school work nor the radio nor movies stimulated them to emotional activity.

Nine children were characterized as emotionally disorganized. Their emotional behavior was variable and unpredictable. Emotional indifference frequently changed to anger or anxiety without observable cause. A situation which seemed to give them emotional satisfaction at one time, produced anxiety at another.

Three children had definite excitement periods during which they were talkative, physically excited, and unable to comprehend directions given them. In one instance the excitement was accompanied by destructive behavior. School difficulties arose especially because of the irritability of these children. If another child interrupted their recitations or if they were accidentally pushed on the playground they were likely to become excessively angry.

MANNERISMS

Mannerisms and compulsive behavior were observed in approximately fifty per cent of the children. Their compulsive-like behavior in the schoolroom caused grave difficulties for their teachers. In the cases of nine children the teachers complained that they interfered with the school routine by suddenly getting up and walking around the schoolroom or by suddenly rising and hitting another child. Compulsions were also inferred from the following behavior of four of the children. So-called ritualistic behavior was observed which, when interfered with, created a great deal of emotional reaction. In the case of one boy of fourteen, the following compulsions were observed. He was seen to repeat every reaction by twos. For example, he fastened the buttons on his shirt twice, and when he was asked on one occasion why he opened and fastened the buttons on his shirt over a period of one hour, he stated that he was never sure that he did it twice and because he might make a mistake "was forced" to repeat his activity. When asked for a definite reason regarding his purpose of repeating

his tasks, he stated that he liked to be neat and adequate and when he repeated an activity he was sure to perform it better. In the case of a girl of seven, it was observed that as she was walking towards the dining room she suddenly kneeled and stayed in that position for some time. When asked what her purpose was she said she felt better when she did that. Another boy invariably rose to his feet when he spoke, with the excuse that he could talk better when he was standing. Another child occasionally ran out of the room, looked around in the hallway, and then came back. Apparently he had no great anxiety and when asked the purpose of his behavior he stated that he just wondered who might be out there in the hallway.

GENERAL BEHAVIOR

Relationship to Other Children. None of the children had close friends or many acquaintances. There were essentially three reasons for their inability to make friends. The most important appeared to be their irritability and quarrelsomness. This type of behavior occurred in eleven children. Four children were seclusive, and refused to take part in ordinary activities. The third reason was the attitude of the other children that they were queer or crazy. They could give no clear reason for their belief, but merely stated that these children "acted and talked funny."

Relationship to Adults. In the majority of cases the children related themselves to adults much more adequately than to other children. Although a number of these children were aggressive and argumentative with adults they nevertheless sought them and showed great dependence. In several instances this dependency manifested itself in innumerable questions about themselves and about information regarding common topics. It was impossible to ascertain whether this was entirely an attention-getting mechanism or whether this was a reaction to the antagonism of the other children.

Personal Interests. All of the adolescent children appeared to be very ambitious in the sense that they attempted to be creative in writing or in drawing or in developing inventions. Five of the adolescent children utilized all of their leisure-time activities either in writing plays or in "creating ideas for the future." None of the children was interested in recreational activities and took little part, unless urged, in play activities common to adolescents. Three children explained their refusal to play with other children by stating that the ordinary play activities were not meant for intelligent children, and, because they wanted to amount to something, they spent their time with books or with drawings. They explained their interest in drawings by stating that they were unable to tell others their ideas except in drawing them. The majority of the children read a great deal more than average children. This was probably due to their seclusion and a way of utilizing their otherwise unoccupied time.

Linguistic Pattern. Evidence of blocking was observed principally in the language behavior of these children, but was also observed in their general behavior. Although they verbalized well, nine of the children were observed to block definitely even though they were talking about some topic which interested them greatly. A common example of blocking was their stopping in the middle of a conversation and its resumption by speaking of irrelevant topics.

Definite language distortions were observed in three children. One boy, when asked when he would arrive at a destination if he started at 2:15 and it took him fifteen minutes to get there, replied 2:95. Another boy stood near a measuring rod and asked the nurse whether the measure showed that he was sixty pounds tall. Still another boy showed linguistic distortion and some disorientation by insisting that instead of going to the beach for one hour he wanted to spend at least forty minutes there. Echolalia and verbigeration were also observed in three children. One boy, who was watching ducks began to repeat

"quack, quack," and this lasted some five minutes following which he said, "I wonder what quack doctors are?" The bizarre ideas which are often noticed in language distortion was observed in a boy of nine who asked a teacher to buy him cowboy suits for him and his dog so that they could sing together.

PARANOID REACTIONS, DELUSIONS, AND HALLUCINATIONS

In only one instance, a girl of nine, was the behavior indicative of hallucinations. She had had many fears since the age of three and had complained of seeing various objects moving around the room. Although it was thought that her behavior was partly for the purpose of obtaining attention, there was no doubt about the anxiety which she showed when she complained of seeing various objects and hearing noises. On several occasions she awoke during the night in great fear and complained that she had heard some people enter her room.

In the case of one boy of fourteen, systematized paranoid behavior was observed. This boy's problems began when he was seven and manifested themselves in temper tantrums, irritability, and inability to get along with his brothers and with his schoolmates. His behavior became worse and when he entered the school he had definite paranoid ideas about other people. He spent his time in drawing and in speaking about his proposed inventions. He talked a great deal about an invention to drive locomotives without steam. His idea was to put carbon dioxide "ice" into the tenders and to drive the wheels by the pressure created by evaporation. He had systematized paranoid ideas about the other children who he believed were teasing and persecuting him because they recognized that he had been a weakling as a child. He believed, however, that he was very strong and thus took every opportunity to fight with the other children. He was nevertheless constantly afraid that the other children would "gang up on him" and hurt him. Paranoid-like ideas were observed in some of the other children but they were considered to be rationalizations of their inability to make friends and the reactions of other children who disliked them and called them queer. These paranoid-like ideas manifested themselves mostly in their constant fear of being teased and their explanations of being disliked by the other children as jealousy of their own superiority.

SUMMARY

It is probable that the frequency of schizophrenic behavior of children is much greater than the statistical evidence of behavior clinics shows. It is probable also that many children are classified loosely as "behavior problems" who in reality show evidence of abnormal personality and emotional disorientations. Whether the characteristics which were described in this paper are diagnostic of schizophrenia, or whether a new diagnostic term should be applied, is immaterial. The reason that the children described in this report were diagnosed as schizophrenic is that the pattern of their behavior resembled in many ways the behavior and symptoms of adult schizophrenic patients.

The most prominent symptom emphasized by parents and teachers was the increasing emotional inadequacy which interfered with the ability of these children to adjust themselves adequately to their environment. In spite of the occasional physical findings which indicated a disturbance of the autonomic nervous system, no definite pattern of physiological defects was found. The intellectual development of these children showed no profound disturbances in terms of test measurement, except for a marked scatter of performance. In none of the children was there evidence either of deterioration or deceleration of mental development. One of the most consistent findings was the relative superiority of verbal ability as compared with other items in the intelligence tests.

Judgmental defects were exhibited by every child in their every-day behavior, although they were able to pass tests involving judgment. It is proposed as a result of the study, to classify judgment into two types - the intellectual and the emotional. As an example, the children were able to make adequate judgments in test situations in relation to their mental level. When emotional problems were involved relating to some personal problem or adjustment, however, the judgment of these children was seriously inadequate. A child who was able to respond adequately to a test involving judgment frequently behaved on an infantile level when the judgment involved a personal relationship having emotional connotations.

Delusional symptoms were not infrequent, but they rarely were as systematized as those found in adults, and in many instances disappeared and reappeared irregularly. On the basis of the findings in these children, and on recent reports in the literature showing that the character of the delusional and hallucinatory symptoms depend upon the social experience of the individual, it is probable that such symptoms are merely the end result of a long process of emotional and personality disorganization and disorientation. As has been mentioned previously in the literature, the delusions, paranoid ideas, and hallucinations of many adult psychotics are in reality healing processes, that is, adjustments which, although abnormal, are, however, part of the reaction to an already developed mental abnormality. The value of the study of abnormal children for an understanding of the development of some of the symptoms of adult abnormalities is obvious.

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A FOLLOW-UP STUDY OF THE BEHAVIOR OF NURSERY SCHOOL CHILDREN[1]

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HISTORY OF THE PROBLEM

STATEMENT OF THE PROBLEM

It is now universally agreed that the early years of a child's life are the most basically important ones. Although the child's behavior can be changed after six or seven years of age, it is rather generally accepted in recent years that certain social and emotional habit patterns and a majority of the habit patterns of a physical and routine type are fairly well established by the time a child is seven or eight years old. The present study was undertaken to discover how early trends in behavior patterns may be said to be related to the later development of the child. In other words, can we in any measure predict the later behavior of the child from his behavior at 2, 3 and 4 years? What problems of behavior and what characteristic social and emotional traits are significant in the early years as judged by later school adjustment? Also, are there certain problems which are seen in the first school years that are not previously evident?

OTHER STUDIES

Although recognition of the importance of the early years is fairly usual, very few actual research studies had been attempted to give evidence for this belief prior to the beginning of this study in 1931. This is particularly true of studies which attempted to follow through the development of a group of children over a number of years. Other than those which emphasized intellectual growth there were few follow-up studies of nursery school children. Taylor and Frank (16) in 1931 reported the results of both Intelligence Quotient and behavior studies of children who had formerly been in nursery school. They studied 30 former nursery school children in Chicago by interviewing the mother and teacher, noting for each problem whether it had been present during the nursery school period, whether the child had shown improvement during that time and whether the mother or teacher had observed the problem to be present in later years. They also gave the children intelligence tests. They mention the inadequacy of the reports made by most public school teachers, the difficulty of obtaining objective judgments from others and the necessity of supplementing such follow-up information with a trained worker's observations of the child in the home.

Greene (10) in 1931 studied children who had formerly been in nursery school. Two teachers rated nursery school and non-nursery school children in eleven paired questions concerning social adaptability. It was found that the nursery school children were average or above average in these points. Driscoll (7) reported in 1933 a prognostic study of the developmental status of 50 nursery school children comparing the nursery school status with the later status of the

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child. (A study of 205 children was also made on the basis of intelligence tests only). There were 30 girls and 20 boys in this study ranging in age from 1 to 4 years when first studied and from 5 through 9 years when studied later. The personality adjustment was determined largely by teachers' descriptive accounts both in the nursery school case study material and in the follow-up teachers' reports. Parents checked a list of 16 undesirable behavior habits in terms of whether they occurred always, frequently, occasionally or never. The educational achievement of the child was also noted in terms of standardized tests. Driscoll was principally interested in seeing what difference in intelligence classification in later school years could be predicted from the nursery school classification. She found that "the predictive value of the pre-school test (intelligence) is limited as judged by the overlapping types of personality adjustment of the children in the several categories and by variation in educational achievement. When the children were reclassified on the basis of a composite rating (including physical, personality and educational adjustment), prognosis of future development as determined by a composite rating was more accurate."

Campbell (3) in 1933 studied the effect of nursery school training upon the later food habits of the child. Eighteen former nursery school and 15 non-nursery school children from 5 to 13 years of age were compared on a Food Habits Rating Scale during a 6-week period at a summer camp. Little difference was found in the food habits of the two groups, although there was some evidence that the nursery group drank more milk and ate more vegetables while the other group ate more eggs and bread. There also seemed some ground for concluding that a long period of attendance at nursery school is more favorable than a short period in the formation of good food habits. However, even long attendance (6 one-half semesters) did not guarantee that the child would have good food habits. Campbell (4) also reported a description of a follow-up laboratory for observing former Merrill-Palmer nursery school children by means of afternoon recreation groups. Problems and tendencies of pre-school years may be studied under these conditions.

Cushing (6) made a tentative study of the influence of nursery school training upon kindergarten adjustment. She studied 33 nursery school children who were on the average 4 months younger than the others, and found that this group rated somewhat superior in general attitude. She concludes that "there is no evidence that the nursery school trained child makes an inferior adjustment to kindergarten despite a handicap in chronological age."

Fisher (8) found that the most reliable differences between two groups of problem and non-problem children in a public school system (360 children in each group) was in the rating of social and emotional adjustment. The social and emotional traits apparent at kindergarten age tended to persist through the succeeding school years. The difference in the early social and emotional adjustment of the two groups was found in kindergarten non-academic activities, such as 1) care of group and personal possessions, 2) ability to plan and execute a project and 3) ability to get along with the group and 4) handwork ability.

Other studies (1, 17) made during the nursery school period itself on the influence of nursery school education have shown that it makes for social adaptability, independence, self-assertiveness, self-reliance and interest in the environment.

LOCATION OF THE STUDY

After careful consideration of difficulties encountered in previous studies the present study was undertaken in the Winnetka Public School Nursery Unit[4]

[4] *Although the Winnetka Public School Nursery Unit now has 3 nursery groups, at the time the study was made it consisted of 2 units: The nursery consisting of 2 and 3 year old children and the junior kindergarten group of 4 year old children. There have been about 16 to 20 children enrolled in each unit.*

located in a community which has relatively infrequent shifting of population. Both teachers and parents are on the whole intelligent observers of their children's behavior. The teachers throughout the school system have had special training in mental hygiene and in general adjustment of children. They have been selected because of their understanding of children as well as for their academic teaching. These teachers are also accustomed to keeping records, since in the Winnetka Public Schools records are considered essential.

Although the nursery school is not supported financially by the school system it is an integral part of the system in every other way. At the time the study was made there were 2 nursery groups (each one of 16 to 20 children entered on a tuition basis) as compared to six kindergarten groups of about 30 each. Obviously not all children in Winnetka can attend the nursery school. The group must be considered as a somewhat selected and superior group since parents most liberal in their thinking are most likely to put their children in nursery school at the ages of two or three. The results of the intelligence tests also indicated that it was a superior group. Most of these children came from homes where there were servants and a large yard in which to play. A majority of children were not placed in nursery school in order that the parents might get rid of them, but were enrolled instead for companionship with other children. Some were also enrolled so that parents could get help with certain specific problems of behavior.

METHODS USED

INTRODUCTION

There are many possible methods of gauging the behavior of children of six years or older. For example, questionnaires such as those by Rogers (14), or Furfey (9) or some such written tests as the May and Hartshorne (12) tests of honesty etc., are possible. With younger children these methods cannot be used, and observation by an adult becomes necessary. The results of the adult's observation may take a number of forms such as direct "verbatim" observations like the diary records, observations noted at frequently recurring intervals, observations of reactions in the test situation, or a generalized rating scale on which the adult judges the child from knowledge of him over an extended period.

GENERAL METHODS USED

The rating scale is now accepted as one of the most useful methods of character diagnosis, provided the scales are specific and the judges thoroughly acquainted with the child (15). At the beginning of this study the Haggerty-Olson-Wickman Behavior Rating Scale (13) was the best rating scale available for use in the primary school grade that also could be used (with some adaptations) for the nursery school child. This scale consists of thirty-five items for rating, on a five point scale, that includes the mental, physical, social and emotional aspects of a child's life. Each of the five points is described, and for each a "problem tendency" score is given. An illustration of the items follows:

29. How does he react to frustrations or to unpleasant situations?

Very submissive Long-suffering	Tolerant Rarely blows up	Generally Self-controlled	Impatient	Easily Irritated Hot-headed Explosive
(3)	(2)	(1)	(4)	(5)

The thirty-five items for so-called "trait rating" comprise Schedule B of the scale; Schedule A consists of a list of behavior problems usually found in school. These problems are checked according to frequency. A weighted score parallels the frequency of each problem.

Since Schedule B was not entirely made for nursery school use there were several items which seemed significant for the earlier years that were not covered by the scale. Accordingly the scale was extended by eight traits (see traits 36-43 in Appendix).

It was further deemed necessary to devise a behavior problem sheet for use in the nursery school years that would parallel Schedule A. A list of 27 possible problems was made after a careful study of previous nursery school cases, lists from other nursery schools, etc. This list was then given to nine nursery school teachers who were asked to specify exactly what behavior they meant by each general heading, - for example, negativism, cruelty, teasing, etc. The final list was expanded to include two or three specific items of behavior under the more general heading. (See Appendix, especially for the description of such problems as "Nervousness", "Sex", etc.) The frequency of each problem was checked not according to a general indefinite description such as "never", occasionally", "often", etc., but by a specific designation of the number of times a problem had occurred in the previous three months, such as 4-10 times, once a week, daily, or 3 times a day, etc. Because certain problems in the Haggerty-Scale A were not adapted to nursery school terminology, problems had to be considered at the two age levels (nursery school and elementary school) by comparing problems with somewhat different terminology. The following are the chief differences between nursery school and elementary school terminology respectively: negativism (or difficulty to manage) - defiance to discipline; difficulty with other children - unpopularity with others; telling untruths - lying and also imaginative lying; teasing - bullying; sex problems - sex offenses (or obscene notes, talks or pictures); "nervousness" - marked overactivity. Although in general these are comparable for the two different age levels, differences in connotations should be kept in mind in the interpretation.

Besides the rating scales and behavior problem sheet a number of questionnaires were filled out by the parents concerning the child's social history, physical history, etc., and notes were made throughout the school year on the children's development etc., in the nursery school. All of this material together with the follow-up material collected over a period of several years constituted an extended case study of each child.

TYPES OF RATERS

There were several types of judges who used both of these rating devices. In the nursery groups the teachers rated the children on the Haggerty-Olson Scale at the end of each year. Both the mothers and the teachers of those children checked the behavior problem sheet at the beginning (after 4 weeks) and at the end of each school year. In the follow-up study of these children the rating was done on the Haggerty-Olson Scale 1) by their grade teachers (both Schedules A and B of the Scale); 2) by their mothers (Schedule B only) and 3) by their observers (principally former nursery school teachers) who rated them on the Haggerty-Olson Scale after three afternoons of diary records observation, including usually both the home and the school. The behavior problem sheet used in the nursery school was also filled out by the mothers of the older children and by the observers.

DEVELOPMENT OF A NEW RATING SCALE

In the course of the first year or so of the follow-up study a need was felt

for a scale which would be more specific than the one already in use, (i.e., the Haggerty-Olson), a scale with more than five points for most items so that descriptions could be found that would be suitable for all types of children. There was special need for a scale which would be constructed in terms of actual classroom situations so that the teacher could make judgments more accurately. Such a scale was constructed with the help of a group of teachers (ranging from nursery school to sixth grade) who worked with the first author for a period of two years. Incidents of behavior taken from classroom observation of children were used as the foundation of the scale (17). The resulting scale (called the Winnetka Scale for Rating School Behavior and Attitudes)[5] was used to rate in a specific manner the five traits of "Co-operation", "Social Consciousness", "Emotional Adjustment", "Leadership" and "Responsibility". This scale was used throughout the Winnetka Schools for three successive years, 1934-1936 inclusive. In this way ratings were obtained on all former nursery school children in the public schools and for the total school population. The latter data were used as norms in the present study and also for comparative purposes.

DISCUSSION OF METHODS USED

Possible errors in judgment on the rating scales were guarded against by 1) establishment of a fair reliability for each scale; 2) the use of three different types of raters, i.e., teacher, mother, observer (former nursery school teacher); 3) repeated ratings over a number of years; 4) observation in the home as well as in the school by a trained teacher who knew the child's background and who was carefully trained in making judgments; 5) long periods of observation preceding judgments; 6) the marking of the certainty of their own judgments by the observers and teachers; and 7) the location of the study in a school system where teachers are trained in observation of children's behavior and its interpretation in terms of mental hygiene principles and in a community where the mothers are on the whole intelligent observers of their children's behavior and quite versed in child study principles. Also, in the case of the behavior problem sheet, the frequency of problems is noted in very specific terms such as "daily", "4-10 times in the last three months" etc., thus avoiding ambiguity of statement such as "occasionally", "frequently", etc. All judgments by the three different types of judges were made within a 4-week period. Having checked and counter checked as carefully as possible at the time, it is nevertheless realized that in this study the results must be considered as founded on subjective data. They are based altogether on teachers' or mothers' impressions, and judgments of children, and not on more objective test results.

SUBJECTS

The children who were in the Winnetka Nursery School from the years 1928-1933 inclusive form the main body of subjects in this study. There were 98 children who "graduated" from the four-year-old group during that time. Of this group it was possible to secure at least one teacher's rating for 81 children on the Haggerty-Olson Scale. Sixty-two of those children had from 2 to 5 teachers' ratings on the scale between entrance to kindergarten and completion of the fifth grade. While the great majority of children were judged by the Winnetka Public School teachers, a few were rated by teachers in nearby private or public schools.

The judgments on the Winnetka Scale for Rating School Behavior and Attitudes were made for the children who left the nursery school from 1928-1934 inclusive, a total of 115. It was possible to secure teachers' ratings for 76 children after "graduation" from the Nursery School. Of this number 53 had two ratings

[5] *Published by the Winnetka Educational Press, Horace Mann School, Winnetka, Illinois.*

and 45 had three ratings on the scale.

The mothers co-operated remarkably well in this study. For 72 of the 86 children who left the junior kindergarten from 1928-1933 it was possible to obtain ratings on the Haggerty-Olson Scale over a period of from one to four years as follows: 4 yearly ratings, 17; 3 yearly ratings, 20; 2 yearly ratings, 20; and 1 rating, 15. Thus 57 children had at least two yearly judgments made by their mothers. The behavior problem sheets were also filled out by 63 of these mothers, the returns for the number of yearly ratings being approximately the same as for the rating scale.

In order to ascertain the incidence of problems in the nursery school, mothers' and teachers' judgments of children who left the junior kindergarten in 1935 and 1936 and those who left the nursery school in 1936 were used. Since records have been kept systematically only since 1931, earlier records were not used (1928-1930), but the addition of these later groups (1934-1936) added approximately 50 cases to the 1931-1934 group. Altogether the study included observations and records of over 165 children.

RESULTS

I. ANALYSIS OF RATERS

AGREEMENT OF RATERS

Correlations were calculated on the summarized trait ratings of Schedule B of the Haggerty-Olson Scale (i.e. on the totals of each division of the scale, - the Mental, Physical, Social and Emotional), for the three types of raters - the teacher, the mother and the observer - and for a composite of the three raters. These correlations are listed in Table I. It will be seen from a study of this table that if the composite of the three judgments is taken as the criterion, the child's present grade teacher is the best judge of all four divisions of the scale. The observer is the next best judge in all divisions except

TABLE I

AGREEMENT OF RATERS ON SCHEDULE B OF HAGGERTY-OLSON SCALE
Pearson coefficients of correlation

	Division I - Mental					Division II - Physical				
	Composite	Present Teacher	Observer	Average Rating	S.D.	Composite	Present Teacher	Observer	Average Rating	S.D.
Present Teacher N =	+.88 (184)			2.53	.639	+.73 (187)			1.78	.472
Observer N =	+.70 (119)	+.52 (113)		2.33	.702	+.69 (118)	+.39 (113)		1.47	.408
Mother N =	+.51 (162)	+.18 (156)	+.11 (94)	1.32	.361	+.58 (162)	+.16 (157)	+.12 (92)	1.78	.347
	Division III - Social					Division IV - Emotional				
Present Teacher N =	+.85 (188)			2.00	.590	+.81 (183)			2.28	.664
Observer N =	+.79 (119)	+.49 (114)		1.81	.508	+.63 (118)	+.34 (113)		1.14	.535
Mother N =	+.70 (165)	+.29 (159)	+.32 (94)	2.29	.409	+.64 (156)	+.53 (148)	+.15 (88)	1.86	.546

the emotional where the mother is equally as good, according to the degree of the correlation (.63 and .64). Other interesting comparisons are that the mother and the child's "present teacher" show a low agreement on mental and physical traits, slightly more agreement on social traits and considerable agreement on emotional traits (r = .53) and that the observer and the mother show little agreement except on social traits (r = .32). It is worthy of note that the correlation between the observer and the "present teacher" on the mental (r = .52) and social (r = .49) traits are as good as those reported by Conrad (5) for agreement between nursery school teachers who judged their own pupils. (Conrad's correlations were .54, .47 and .50). The correlation of the ratings of the mother and the child's grade teacher on the emotional traits (r = .53) is also as good as the nursery school judges reported by Conrad.

On the basis of the above results it was decided to take the child's grade teacher as the principal judge of the child's later progress, supplementing where desirable from the judgments of the mother and the observer.

AGREEMENT ON SPECIFIC TRAITS

A study of specific traits on which the raters agree is interesting, (Table II). Considering all three types of raters it may be seen that there is most agreement on the degree of sociability, talkativeness, reaction to failure, degree of leadership, attention, flexibility and acceptance of authority. Between the child's teacher and the observer there is most agreement on degree of sociability, flexibility, alertness, demand for attention, leadership, talkativeness, reaction to failure, negativism, degree of attention, acceptance of authority and assertiveness. The teacher and the mother showed most agreement on the child's degree of sociability, his reaction to failure, his negativism, his

TABLE II

AGREEMENT OF RATERS ON TRAIT ITEMS OF SCHEDULE B

Haggerty-Olson Scale
Contingency coefficients of correlation

TRAIT	OBSERVER TEACHER	OBSERVER MOTHER	TEACHER MOTHER
2. Alertness	+.50	+.05	+.05
3. Attention	+.37	+.23	+.40
7. Degree of Interest	-.06	+.04	-.21
14. Courage	+.08	-.04	-.05
15. Talkativeness	+.42	+.43	+.39
17. Social Habits	+.13	-.02	.00
18. Degree of Boldness	+.24	+.27	+.17
20. Acceptance of Authority	+.36	+.30	+.22
21. Flexibility	+.58	+.21	+.32
23. Degree of Assertion	+.36	-.02	+.11
24. Tendency to Criticize	+.21	-.10	+.09
26. Persistence	+.17	-.10	+.04
28. Affection and Sympathy	+.13	+.20	-.06
29. Reaction to Failure	+.42	+.29	+.44
30. Worrisomeness	+.07	+.25	+.17
32. Trustfulness	+.29	+.06	+.05
34. Negativism	+.40	-.02	+.09
36. Attention Seeking	+.47	+.19	+.19
37. Dependence on Adults	+.04	+.08	+.21
38. Degree of Sociability	+.59	+.55	+.64
39. Leadership	+.46	+.14	+.34
40. Respect for Property Rights	+.29	+.13	+.25
42. Exploration of Environment	.00	+.16	+.32
43. Degree of Creativeness	+.17	+.07	-.01

N = 70 to 90

attention, his talkativeness, his leadership, his flexibility and the degree to which he explores his environment. There were only three traits on which the observer and the mother showed any real degree of agreement (a correlation of .30 or above). They are the degree of sociability, talkativeness and acceptance of authority (all traits fairly easily observable within a short time).

Although children tend to show different aspects of their personalities to different people and change somewhat as their environment changes, nevertheless there is usually a "most frequent personality" for each individual. The traits upon which there is most agreement between 2 and 3 judges under the conditions of this study appear to be either the traits which are the most obvious or those traits which are likely to remain the same in both the home and the school. These traits should be especially kept in mind when the interpretations are made.

LENIENCY OF RATERS

Since a low score indicates a better rating it may be seen from the average judgments in Table I which type of rater judged the child to be higher in that division of the rating scale. The observer gave the child a better rating in all divisions of the scale except the mental. The explanation of this may be that the majority of observers were nursery school teachers who ordinarily see less mature behavior. The mother's rating of the mental traits was considerably better than the others. The mother also gave the child a better rating than the teacher on the emotional traits and the same rating on the physical traits. It is possible that the mother's hopes may color her views on mental and emotional traits. However, the teacher gave the child a better rating on the social traits than did the mother, - perhaps because she sees him in a truer prospective in relation to other children. In all cases but the mental division the teacher's rating shows a wider span of rating than the other two raters (as judged by the standard deviation).

CERTAINTY OF RATERS

The observers and teachers were asked to check on Schedule B of the Haggerty-Olson Scale the traits of which they were most certain and those of which they were least certain. (Often they omitted traits which they had no opportunity to observe). Table III shows the per cent of judgments on which the two types of raters were uncertain. In general, the least certain traits were emotional ones, both the observer and the teacher hesitated to give their judgment of the child's worrisomeness, persistence, courage, trustfulness and reaction to failure. There were some traits about which the observers were less certain than the teacher - the child's flexibility, his tendency to criticize and his exploration of his environment. The teachers were less certain than the observers about degree of attention, tendency to give in or assert himself or his social habits. The raters in general seemed most certain of the social and mental traits, such as the child's alertness, his interest in things, his demand for attention, his degree of sociability and his confidence in himself. There were traits of which the observers felt more sure than the teacher, such as the child's talkativeness, his dependence on adults, his degree of attention and his reaction to authority. The teacher felt more certain than the observer for such traits as the child's tendency to lead or follow, his respect for other's property rights, his exploration of his environment and his tendency to criticize. It may be seen that the observer was more certain for types of behavior which may be observed in a relatively short time. On the whole it was the somewhat more overt types of behavior about which both teacher and observer felt more certain.

These results should be kept in mind when interpreting the results of the ratings. Cady (2) reports that the reliability varies with the degree of confidence in the ratings and that high reliability may be obtained by selecting

TABLE III

PER CENT OF JUDGMENTS ON WHICH OBSERVERS AND TEACHERS INDICATED UNCERTAINTY ON Haggerty-Olson Scale, Schedule B

TRAIT	OBSERVER	TEACHER	BOTH
2. Alertness	9 C	6 C	15 C
3. Attention	10 C	13 U	23 C
7. Degree of Interest	11 C	6 C	17 C
14. Courage	37 U	11 U	48 U
15. Talkativeness	5 C	8	13 C
17. Social Habits	16	12 U	28
18. Degree of Boldness	15 C	9	24
20. Acceptance of Authority	16 C	8	24 U
21. Flexibility	34 U	8	42 U
23. Degree of Assertion	24	12 U	36
24. Tendency to Criticize	30 U	9	39 U
26. Persistence	35 U	15 U	50 U
28. Affection and Sympathy	17	9	26
29. Reaction to Failure	31 U	12 U	43 U
30. Worrisomeness	41 U	12 U	53 U
32. Trustfulness	32 U	13 U	44 U
34. Negativism	29	7 C	36
36. Attention Seeking	14 C	6 C	20 C
37. Dependence on Adults	13 C	8	21 C
38. Degree of Sociability	17 C	4 C	21 C
39. Leadership	25	3 C	28
40. Respect for Property Rights	21	5 C	26
42. Exploration of Environment	41 U	6 C	47 U
43. Degree of Creativeness	28 C	8	36

U = most uncertain judgments
C = Most certain judgments

those ratings of which the judge feels sure.

COMPARISON WITH OLSON NORM

Another check in the teacher's rating of the Haggerty-Olson Scale was made by comparing the total scores on Schedule B of 61 first grade children with the score obtained by Olson (13) in the Minneapolis Public Schools: The average teacher's rating of the 61 children was 71.02 (total scores) whereas the score for the Minneapolis group of 1537 first grade children was 69.50. The slight difference may be due to the fact that there were about 44 per cent more boys than girls in the Winnetka group. The Minneapolis score for the 798 boys was 72.80.

PREDICTABILITY OF TRAIT RATINGS

Correlations were calculated between the Haggerty-Olson Scale judgments made by the teachers in the nursery school and judgment made in the early school years by the grade teachers in the case of 34 children. The highest predictability was in the physical traits ($r = +.50$). The next highest was in the case of the social traits ($r = +.46$). Still positive but low was the correlation for the emotional traits ($r = +.35$). No correlation was found in the case of the mental traits ($r = -.03$). This may mean that the child's physical and social characteristics are somewhat more settled by the end of the fourth year than his emotional and mental traits. It may also mean only that the former were more overt and observable than the latter or it may mean we have better methods for measuring physical and social than for measuring mental and emotional traits. The low correlation found for the mental traits may be due to the fact that at the nursery school level the child's mental behavior is less separable from his

emotional and social behavior than at the upper level and less easily determined than at the upper levels where there is a premium on academic performance or mental response.

II. RELATION OF NURSERY SCHOOL BEHAVIOR TO LATER ADJUSTMENT

The follow-up children from grades 1 to 6 in the Winnetka Public Schools were divided into two groups: (a) those who had made a good adjustment in their later school life (according to the judgment of from one to three teachers, usually two) and (b) those who had made a relatively less effective adjustment. The adjustment was judged in two ways, by means of Schedule A (Problem frequency) of the Haggerty-Olson Scale and by means of the Winnetka Behavior Rating Scale. The division was made at the median score of the follow-up group in the case of each of the scales.[6]

A study was then made of the nursery school behavior of the two groups to determine what problems might be significant in terms of later school behavior and what problems might be relatively insignificant.

NURSERY SCHOOL BEHAVIOR OF WELL AND LESS WELL ADJUSTED ELEMENTARY SCHOOL CHILDREN WHEN GROUPED ON THE BASIS OF HAGGERTY-OLSON SCHEDULE A AND WHEN COMPARED ON THE BASIS OF THE NURSERY SCHOOL BEHAVIOR SHEET

The children in the less well adjusted elementary groups (as judged by the Haggerty-Olson Schedule A) were, when in the nursery school, habitually more difficult to manage, had more difficulty with other children, sucked their thumbs and fought more often than did the children in the better adjusted group. (Table IV). In terms of general tendencies rather than habitual behavior, the children in the less well adjusted group were likewise difficult to manage, negativistic and showed more tendencies to suck their thumbs. In addition they had more temper outbursts, and more jealousy than did the other group. (These differences are not statistically significant).

It may be that the underlying causes for serious problems (those likely to continue over a period of years) may be found by studying the genesis of the above behavior. Experience with individual cases as discussed in nursery school staff meetings points out the possibility that the reasons why children are difficult to manage, have relatively more difficulties with other children, suck their thumbs, fight, have temper outbursts or show jealousy, etc., may be found in the home environment. In such cases the causes of the difficulties tend to be constant and so deep-seated that it may be difficult if not impossible to remove them by the ordinary educational methods.

NURSERY SCHOOL BEHAVIOR OF WELL AND LESS WELL ADJUSTED ELEMENTARY SCHOOL CHILDREN WHEN GROUPED ON THE BASIS OF THE WINNETKA SCALE FOR RATING SCHOOL BEHAVIOR AND WHEN COMPARED ON THE BASIS OF THE NURSERY SCHOOL BEHAVIOR SHEET

All nursery school graduates in the Winnetka Public Schools were rated by their teachers for two successive years on the Winnetka Scale for Rating School Behavior and Attitudes. Since this scale covered the same scope but was more specific than the Haggerty-Olson Scale Schedule B, the children were compared on it rather than on the latter basis. Since the Social and Emotional Divisions of Schedule B correlated to a fairly high degree (r =.71) with the Winnetka School Behavior Scale, much the same results might be expected from comparisons

[6] *Since the group as a whole was a superior group, some of these children who would ordinarily be considered as better adjusted were therefore in the poorer half of the study. This may be seen readily from the fact that the median of the follow-up group was found to be about 6.0 on the Winnetka Behavior Scale (See Figure III), one decile higher than the general Winnetka School population. Therefore these children who had scores between 5.0 and 6.0 were in the so-called "less poorly adjusted group" of the two divisions made in this study. It is very possible that greater differences would have been found if the groups had been large enough to compare only the extremes.*

TABLE IV

HOW TWO GROUPS OF ELEMENTARY SCHOOL CHILDREN DIFFER IN THEIR NURSERY SCHOOL BEHAVIOR

When Divided on the Basis of Better and Poorer Scores on the Haggerty-Olson Scale Schedule A (Problems)

	Better Scores in Elementary School per cent	Poorer Scores in Elementary School per cent	Difference (Better Group compared to Poorer) per cent	Critical Ratio
Per cent of Occurrence of Habitual Problems in the Nursery School - (N = 24 in each group)				
Difficulty in Management	6	27	-21	2.06
Difficulty with Other Children	3	17	-14	1.65
Thumbsucking	2	16	-14	1.73
Fighting	2	11	- 9	1.30
Negativism	12	21	- 9	0.85
Crying	7	14	- 7	0.80
Temper Outbursts	2	8	- 6	0.97
Teasing	7	11	- 4	0.49
Nervousness	18	21	- 3	0.26
Enuresis	3	6	- 3	0.50
Cruelty	0	3	- 3	0.86
Jealousy	0	3	- 3	0.86
Day Dreaming	3	6	- 3	.50
Telling Untruths	3	5	- 3	.33
Nail-biting	2	0	+ 2	.07
Speech Difficulty	20	18	+ 2	.18
Fears	5	3	+ 2	.36
Destructiveness	3	0	+ 3	.86
Sex Curiosity	5	0	+ 5	1.13
Eating	29	22	+ 7	.56
Sleeping	30	23	+ 7	.55
Nervous Habits	15	8	+ 7	.76
Per cent of Problems Occurring to "Any Degree" of Frequency				
Difficulty in Management	35	67	-32	2.33
Negativism	35	64	-29	2.08
Thumbsucking	12	37	-25	2.08
Temper Outbursts	20	42	-22	1.69
Nervousness	35	52	-17	1.19
Fighting	37	53	-16	1.11
Difficulty with Children	48	62	-14	.97
Crying	59	71	-12	.89
Eating	46	57	-11	.76
Jealousy	2	13	-11	1.47
Enuresis	8	17	- 9	.95
Cruelty	7	16	- 9	.97
Destructiveness	30	39	- 9	.61
Telling Untruths	10	19	9	.89
Nail-biting	24	29	- 5	.39
Teasing	46	51	- 5	.34
Speech Difficulty	34	32	+ 2	.22
Day Dreaming	41	40	+ 1	.70
Sleeping	35	35	0	.00
Fears	15	13	+ 2	.20
Sex Curiosity	20	16	+ 4	.36
Nervous Habits	35	27	+ 8	.60

on the basis of either scale.

There were 34 children in each group (well and less well adjusted) when the division was made. The results of the comparison of these two groups (Table V) show that frequent problems in routines such as eating and sleeping are unimportant in terms of later school adjustment, since the better adjusted elementary group showed more of these problems in nursery school than did the less well adjusted elementary group. (These differences can not be considered statistically significant). Also showing little relationship to later school adjustment, judged by scores on the Winnetka Scale, were the following: telling untruths, so-called "nervous habits", day dreaming, marked sex curiosity, cruelty, nail-biting, so-called destructiveness, enuresis, jealousy and fears. These findings are confirmed by the comparisons made on the basis of the Haggerty-Olson Scale, Schedule A (Table IV).

The habitual behavior at the end of nursery school which did seem to forerun less adequate future adjustment included negativism, difficulty in management, difficulty with children, excessive crying, teasing, temper outbursts, fighting and "nervousness". The difference in negativism between the two groups is statistically significant. The other characteristics listed above show 90 chances or more in 100 of being true differences. Such habitual behavior as thumbsucking, speech difficulties, fears and jealousy also show a slight tendency to forerun less adequate future adjustment, though the tendency is less marked than in the earlier named traits. Comparisons made in terms of problems occurring to any degree of frequency lend additional weight to the statement that negativism, difficulty in management, difficulty with other children, fighting, "nervousness", teasing and jealousy are early forerunners of difficulties in future adjustment (Table V). The remaining types of behavior listed in Table V seem to have relatively little significance in predicting future adjustment.

It will be seen from comparing Tables IV and V that there is relatively close agreement between the findings based on the two different types of grouping.[7]

NURSERY SCHOOL BEHAVIOR OF WELL AND LESS WELL ADJUSTED ELEMENTARY SCHOOL CHILDREN WHEN GROUPED ON THE BASIS OF THE WINNETKA SCALE AND WHEN COMPARED ON THE BASIS OF THE HAGGERTY-OLSON SCHEDULE B AND ITS EXTENSION

When the forty-eight nursery school graduates in grades 1 to 4 who had scores on the Winnetka Behavior Scale were studied on the basis of ratings on the Haggerty-Olson Schedule B in the Nursery School Unit, the following facts were evident:

1. On the basis of trait scores for the Social and Emotional Division of the scale (Items 15 to 35) the better adjusted elementary group were found to have been in nursery school more flexible, more adequately responsive to failure, more deliberate and cautious, more friendly and sympathetic, more suggestible and even tempered and were described as having more acceptable behavior and as being self-conscious less frequently. Those less well adjusted were, in nursery school, bolder, less flexible, less adequately responsive to failure,

[7] *It should be emphasized again that all of these differences are comparatively small (none over 32 per cent) and that they are to be considered as tendencies and not actual predictions of future adjustment. Another finding to be kept in mind in interpreting the results is that the percentage of children having the problems was after all very low in the case of habitual problems. At all times less than one-third of the nursery school children exhibited these tendencies. The median percentage of occurrence of the habitual problems was from 10 to 15 per cent in the poorer groups. (Tables IV and V). However, when the problems occurring in any degree in the nursery school are studied the percentage of cases in which they occurred is much higher, having a median per cent of from 30 to 40 in the poorer group. The problems which occurred to any degree of frequency in the nursery school period exhibited by over 50 per cent of the children were: negativism, difficulty in management, difficulty with other children, crying, eating, fighting, teasing, and "nervousness".*

TABLE V

HOW TWO GROUPS OF ELEMENTARY SCHOOL CHILDREN DIFFER IN THEIR NURSERY SCHOOL BEHAVIOR

When Divided on the Basis of Better and Poorer Scores on the Winnetka Scale for Rating School Behavior

	Better Scores in Elementary School per cent	Poorer Scores in Elementary School per cent	Difference (Better Group compared to Poorer) per cent	Critical Ratio
Per cent of Occurrence of Habitual Problems in the Nursery School - (N = 34 in each group)				
Negativism	7	32	-25	2.72
Difficulty in Management	10	33	-23	2.40
Difficulty with Other Children	7	23	-16	1.93
Crying	3	16	-13	1.88
Teasing	6	18	-12	1.54
Fighting	3	15	-12	1.80
Temper Outbursts	0	12	-12	2.14
Nervousness	13	25	-12	1.30
Thumbsucking	9	18	- 9	1.10
Speech Difficulty	12	21	- 9	1.01
Fears	3	9	- 6	1.05
Jealousy	0	3	- 3	1.08
Enuresis	3	6	- 3	.60
Destructiveness	0	3	- 3	.11
Nail-biting	3	3	0	.40
Sex Curiosity	3	3	0	.40
Cruelty	0	0	0	.00
Day Dreaming	12	10	+ 2	.26
Nervous Habits	15	13	+ 2	.24
Telling Untruths	6	3	+ 3	.60
Sleeping	25	17	+ 8	.85
Eating	28	14	+14	1.50
Per cent of Problems Occurring to "Any Degree" of Frequency				
Negativism	39	75	-36	3.27
Difficulty in Management	45	67	-22	1.87
Difficulty with Other Children	48	63	-15	1.25
Fighting	41	56	-15	1.25
Nervousness	37	50	-13	1.07
Teasing	44	56	-12	1.20
Jealousy	0	12	-12	2.14
Enuresis	9	18	- 9	.75
Eating	47	55	- 8	.67
Thumbsucking	25	32	- 7	.64
Fears	14	21	- 7	.75
Sleeping	25	31	- 6	.55
Sex Curiosity	15	21	- 6	.64
Temper Outbursts	26	32	- 6	.55
Cruelty	9	14	- 5	.64
Speech Difficulty	29	32	- 3	.27
Destructiveness	33	33	0	.00
Day Dreams	39	36	+ 3	.25
Crying	62	58	+ 4	.34
Nail-biting	35	30	+ 5	.44
Telling Untruths	18	12	+ 6	.69
Nervous Habits	41	30	+11	.95

more impulsive and unreflective, more negativistic and moody, and were described as showing less acceptable behavior and more extreme variations in affection.

2. On the basis of separate trait items, the better adjusted elementary group was found (Table VI) to have exceeded the other group in nursery school in:

Reference number on Haggerty-Olson Scale	Behavior as described on the Haggerty-Olson Scale
15-2	Upholding his end of talk
17-1,2,3	Showing fewer extremes of social behavior
18-1	Showing self-consciousness on occasions only
20-1	Being respectful, complying by habit
21-1	Being quick to accept new customs and methods
29-1	Generally showing more self-control
31-1	Being quite willing to cooperate
33-1	Being quite normal in emotional response
34-2	Being more generally persuaded by suggestion
39-C	Willing to lead and follow according to the necessities of play
40-C	Asking politely for other child's toys
41-C	Taking turns willingly but defends own rights
42-C	Being alert to explore his environment
43-B	Being likely to create or construct

3. The less well adjusted elementary group were found to exceed the other group in nursery school in

Reference number	Behavior as described on Haggerty-Olson Scale
15-4	Talking more than his share
18-3,5	Being more confident in himself and bold in social relationships
19-4	Having a disagreeable personality
20-4	Being critical of authority
22-4	Being sometimes unmannerly and saucy
26-4	Never giving in, being obstinate
27-4	Being generally dispirited
28-3,4	Showing extremes of sympathy, very affectionate or unsympathetic, disobliging and cold
29-3	Showing extreme reactions to frustration, very submissive
30-3	Being easy-going
31-2,3	Being only conservatively cooperative or somewhat uncooperative
33-3	Having emotions easily aroused
34-4	Complying slowly to suggestion
35-4	Acting frequently without reflection and prudence
36-A	Very frequently making direct demands for attention
37-B	Attempting things obviously too hard
39-B,D	Generally tending to follow and imitate others or tending to lead only in certain activities
40-B	Occasionally taking toys without permission
41-B,D	Giving up toys only upon suggestion or offering

	toys without being asked
43-C	Being less creative with materials than the average[8]

Traits on which the differences were statistically significant (i.e., 100 chances in 100) in favor of the better adjusted elementary group while in nursery school were: self-control in reaction to frustrations or unpleasant situations (29-1,3), cooperation in discussion of himself and his problems (31-1), willingness to lead or follow according to the necessities of the play (39-C), and willingness to take turns but to assert own rights if necessary (41-C).

NURSERY SCHOOL BEHAVIOR OF ELEMENTARY CHILDREN WHEN GROUPED IN TERMS OF SPECIFIC TRAITS (THE FIVE DIVISIONS OF THE WINNETKA SCALE) RATHER THAN IN TERMS OF GENERAL ADJUSTMENT, AND WHEN COMPARED ON THE BASIS OF COMPARABLE RATINGS DRAWN FROM THE HAGGERTY-OLSON SCALE AND FROM THE NURSERY SCHOOL BEHAVIOR SHEET

The Winnetka Scale contains five major divisions: Cooperation, Social Consciousness, Emotional Adjustment, Leadership and Responsibility. It seemed of value to compare the nursery school behavior of elementary children making high and low scores on these respective divisions. The results appear in Table VII.

Cooperation: As comparable measures of cooperation, items 16 to 23 were chosen from the Haggerty-Olson Scale. These items deal with acceptability of behavior to ordinary social standards and with the degree to which the individual asserts himself or yields when necessary. Item 38 on the extension scale, which deals with the child's degree of sociability, was also chosen, as were the frequency scores of negativism and difficulty in management on the Nursery School Behavior Sheet. A comparison of these data indicated that the less cooperative elementary group had been significantly more negativistic in nursery school. They had also tended (critical ratio of 1.3 or more) to be:

23-2	Assertive
38-C	Indifferent to other children, entering activities only when urged
	Difficult to manage

The more cooperative elementary group also tended to exceed the other group in nursery school in:

23-4	Generally yielding
38-B	Preferring to be with children but can be self-sufficient

[8] *For the above traits the chances are better than 90 in 100 that similar differences would be found again. For the traits listed below the chances are better than 80 in 100 that similar differences would be found in a comparable study. The better adjusted elementary group exceeded the other group in nursery school in:*

16-1	*Being always socially acceptable*
23-4	*Generally yielding*
24-1	*Rarely criticizing*
29-2,4	*Showing fewer extremes of reaction to unpleasant behavior*
30-1	*Being disinclined to worry without cause*
34-1	*Being more generally open-minded to suggestion*
35-1	*Being deliberate in reactions*
37-D	*Attempting to help himself only when urged*

The less well adjusted elementary group was found to exceed the other group in nursery school in:

15-5	*Jabbering*
21-3,5	*Being both slow to accept new customs and methods, and stubborn, hidebound and nonconforming*
23-2,3	*Being assertive, insistent, and obstinate*
24-2	*Commenting on outstanding weaknesses or faults of others*
25-5	*Having periods of extreme elations or depressions*
27-5	*Being hilarious*
29-5	*Easily irritated, hot headed or explosive*
33-4	*Showing no emotional response or apathetic*
40-A	*Frequently grabbing others' toys*
42-A,B	*Exploring to extreme degree, at times being destructive and disregarding others rights*

TABLE VI

HOW TWO GROUPS OF ELEMENTARY CHILDREN DIFFER IN THEIR NURSERY SCHOOL BEHAVIOR ON SPECIFIC PARTS OF THE HAGGERTY-OLSON TRAIT RATINGS, SCHEDULE B, ITEMS 15-25

When the Groups are Divided on the Basis of Better and Poorer Scores (Per cent) in the Winnetka Behavior Scale (N = 21 in each group)

Part	Better	Poorer	Difference	C. R.*	Better	Poorer	Difference	C. R.	Better	Poorer	Difference	C. R.	Better	Poorer	Difference	C. R.	Better	Poorer	Difference	C. R.
	Item 15				Item 16				Item 17				Item 18				Item 19			
1	11	12	- 1	0.10	32	17	+15	1.12	61	24	+37	2.63	70	33	+37	2.65	11	6	- 5	0.57
2	61	29	+32	2.19	00	00	00	0.00	28	47	-19	1.30	4	4	00	0.00	78	71	+ 7	0.52
3	00	00	00	0.00	59	67	- 8	0.52	5	24	-19	1.81	26	50	-24	1.63	11	18	- 7	0.63
4	28	53	-25	1.69	9	17	- 8	0.77	00	00	00	0.00	00	00	00	0.00	00	6	- 6	1.15
5	00	6	- 6	1.15	00	00	00	0.00	5	6	- 1	0.14	00	13	-13	1.76	00	00	00	0.00
	Item 20				Item 21				Item 22				Item 23				Item 24			
1	44	23	+21	1.47	35	13	+22	1.70	28	18	+10	0.76	48	44	+ 4	0.26	78	65	+13	0.93
2	00	00	00	0.00	56	58	- 2	0.01	00	00	00	0.00	30	44	-14	0.95	22	35	-13	0.93
3	56	59	- 3	0.19	9	25	-16	1.01	67	65	+ 2	0.13	00	4	- 4	0.93	00	00	00	0.00
4	00	18	-18	2.09	00	00	00	0.00	5	18	-13	1.31	22	9	+13	1.17	00	00	00	0.00
5	00	00	00	0.00	00	4	- 4	0.93	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00
	Item 25				Item 26				Item 27				Item 28				Item 29			
1	23	17	+ 6	0.48	74	63	+11	0.78	69	67	+ 2	0.13	50	42	+ 8	0.52	90	53	+37	2.91
2	50	50	00	0.00	4	8	- 4	0.23	22	17	+ 5	0.41	50	42	+ 8	0.52	5	00	+ 5	1.06
3	00	00	00	0.00	22	25	- 3	0.23	9	00	+ 9	1.43	00	8	- 8	1.36	00	41	-41	3.79
4	27	29	- 2	0.15	00	4	- 4	0.93	00	13	-13	1.76	00	8	- 8	1.36	5	00	+ 5	1.06
5	00	4	- 4	0.93	00	00	00	0.00	00	4	- 4	0.93	00	00	00	0.00	00	6	- 6	1.15
	Item 30				Item 31				Item 32				Item 33				Item 34			
1	78	65	+13	0.93	78	23	+55	4.23	78	76	+ 2	0.15	79	59	+20	1.42	82	71	+11	0.84
2	17	18	- 1	0.08	28	59	-31	2.11	11	6	+ 5	0.58	00	00	00	0.00	12	00	+12	1.69
3	5	18	-13	1.34	00	18	-18	2.14	11	18	- 7	0.64	16	35	-19	1.43	00	00	00	0.00
4	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00	00	6	- 6	1.15	6	30	-24	2.12
5	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00	5	00	+ 5	1.06	00	00	00	0.00
	Item 35				Item 36				Item 37				Item 38				Item 39			
1	40	25	+15	1.04	A	00	13	-13	1.76	00	00	00	0.00	13	8	+ 5	0.53	00	00	00	0.00
2	52	54	- 2	0.13	B	9	17	- 8	0.77	00	13	-13	1.75	78	75	+ 3	0.23	13	33	-20	1.56
3	4	4	00	0.00	C	61	50	-11	0.72	74	75	- 1	0.07	9	17	- 8	0.77	74	33	+41	2.89
4	4	17	-13	1.39	D	30	25	+ 5	0.36	26	13	+13	1.07	00	00	00	0.00	4	25	-21	2.00
5	00	00	00	0.00	E	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00	9	13	- 4	0.41
	Item 40				Item 41				Item 42				Item 43							
A	00	4	- 4	0.93	00	00	00	0.00	00	12	-12	1.21	00	00	00	0.00				
B	26	50	-24	1.63	9	29	-20	1.68	00	12	-12	1.21	94	82	+12	1.21	Extension of Scale (See Appendix)			
C	70	38	+32	2.18	87	54	+33	2.92	81	58	+23	1.65	6	17	-11	1.12				
D	4	8	- 4	0.54	4	17	-13	1.40	19	17	+ 2	0.17	00	00	00	0.00				
E	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00	00	00	00	0.00				

*Critical Ratio

TABLE VII

HOW TWO GROUPS OF ELEMENTARY CHILDREN DIFFER IN THEIR NURSERY SCHOOL BEHAVIOR

When Divided on the Basis of Better and Poorer Scores (Per cent) in the Five Divisions of Winnetka Behavior Scale

I. Cooperation

Part	Item 16 Better	Poorer	Difference	C. R.*	Item 23 Better	Poorer	Difference	C. R.		Item 38 Better	Poorer	Difference	C. R.	Negativism Better	Poorer	Difference	C. R.	Dif. in Management Better	Poorer	Difference	C. R.
	N = (23)	(24)			(27)	(27)				(23)	(26)			(26)	(31)			(26)	(29)		
1	35	21	-14	1.08	52	37	+15	1.12	A	9	8	+ 1	0.12	any degree				any degree			
2	00	00	00		15	41	-26	2.20	B	87	72	-15	1.30	44	81	-37	3.06	62	79	-17	1.38
3	57	62	- 5	0.34	00	7	- 7	1.43	C	4	20	-16	1.78								
4	9	17	- 8	0.74	30	15	+15	1.33	D	00	00	00	0.00	frequent				frequent			
5	00	00	00	0.00	00	00	00	0.00	E	00	00	00	0.00	11	32	-21	2.00	12	38	-26	2.34

II. Social Consciousness

	Item 23 Better	Poorer	Difference	C. R.	Item 25 Better	Poorer	Difference	C. R.	Item 27 Better	Poorer	Difference	C. R.	Item 30 Better	Poorer	Difference	C. R.		Item 38 Better	Poorer	Difference	C. R.
	N = (29)	(31)			(24)	(25)			(25)	(26)			(25)	(24)				(25)	(26)		
1	59	38	+21	1.67	21	23	- 2	0.10	68	76	- 8	0.63	64	62	+ 2	0.14	A	12	8	+ 4	0.47
2	17	38	-17	1.53	58	38	+20	1.38	24	15	+ 9	0.81	20	17	+ 3	0.27	B	84	80	+ 4	0.37
3	00	00	00	0.00	00	8	- 8	1.45	00	4	- 4	1.00	12	21	- 9	0.85	C	4	16	-12	1.46
4	24	19	+ 5	0.47	12	23	-11	1.04	8	4	+ 4	0.59	4	00	+ 4	1.01	D	00	00	00	0.00
5	00	00	00	0.00	00	4	- 4	1.00	00	00	00	0.00	00	00	00	0.00	E	00	00	00	0.00

III. Emotional Adjustment

	Item 26 Better	Poorer	Difference	C. R.	Item 27 Better	Poorer	Difference	C. R.	Item 29 Better	Poorer	Difference	C. R.	Item 30 Better	Poorer	Difference	C. R.
	N = (29)	(29)			(28)	(22)			(29)	(26)			(25)	(22)		
1	72	48	+24	1.94	68	68	00	0.00	66	38	+28	2.15	68	64	+ 4	0.29
2	7	17	-10	1.18	25	18	+ 7	0.59	14	8	+ 6	0.72	24	9	+15	1.42
3	17	31	-14	1.25	00	5	- 5	1.06	00	4	- 4	1.05	8	27	-19	1.73
4	00	4	- 4	1.11	7	5	+ 2	0.30	17	42	-25	2.08	00	00	00	0.00
5	4	00	+ 4	1.11	00	5	- 5	1.06	00	8	- 8	1.51	00	00	00	0.00

IV. Leadership

	Item 17 Better	Poorer	Difference	C. R.	Item 18 Better	Poorer	Difference	C. R.		Item 39 Better	Poorer	Difference	C. R.
	N = (28)	(29)			(28)	(27)				(28)	(28)		
1	50	45	+ 5	0.38	57	40	+17	1.28	A	00	10	-10	1.77
2	36	31	+ 5	0.40	4	3	- 1	0.20	B	7	38	-31	2.98
3	7	18	-11	1.28	39	30	+ 9	0.70	C	71	28	+43	3.55
4	00	3	- 3	0.94	00	3	- 3	0.91	D	7	14	- 7	0.85
5	7	3	+ 4	0.69	00	15	-15	2.16	E	15	10	+ 5	0.56

V. Responsibility

	Item 37 Better	Poorer	Difference	C. R.
	N = (32)	(31)		
1	00	00	00	0.00
2	00	13	-13	2.17
3	75	45	+30	2.54
4	25	29	- 4	0.36
5	00	12	-12	2.09

*Critical Ratio

Social Consciousness: Items chosen from the Haggerty-Olson Scale to parallel the Winnetka Behavior Scale were: 23, (explained previously); 25, evenness of mood; 27, cheerfulness versus depression; and 30, degree to which the child tends to worry. Item 38, also explained previously, was selected from the Extension Scale. The comparison indicated that the less socially conscious elementary children had tended to be, in nursery school:

23-2	Assertive
25-3	Stolid, showing less changes of mood
38-E	Indifferent toward other children, entering activity with other children only when urged

The more socially conscious elementary children had tended in nursery school:

23-1	To hold their own, but yield when necessary
25-2	To be happy or depressed as conditions warrant

Emotional Adjustment: Items chosen from the Haggerty-Olson Scale to parallel the Winnetka Scale were: 26, persistence; 27, cheerfulness versus depression; 29, reaction to frustration or unpleasant situations; and 30, the degree to which the child worries. On the basis of these comparisons the less well adjusted elementary group had tended to exceed the better adjusted group in nursery school in being:

29-4	Impatient at frustration
29-5	Easily irritated, hot headed, explosive at frustrations
30-3	Easy-going

The better adjusted group showed more the following behavior in nursery school:

26-1	Gave everything a fair trial
29-1	Generally self-controlled in reaction to frustration or unpleasant situations
30-2	Apprehensive or unduly worrisome

Leadership: The items chosen from the Haggerty-Olson Scale were 17 and 18, which deal with social habits and shyness or boldness in social relationships. Item 39 from the Extension Scale, which deals directly with leadership, was also chosen. These data indicated that the weaker leader in the elementary group exceeded the stronger leaders, when in nursery school, in:

17-3	Following fewer social activities
18-5	Being bold, insensitive to social feelings
39-A,B	Always or generally tending to follow and imitate others

The stronger leaders exceeded the other group in being:

18-1	Self-conscious on occasions only
39-C	Willing to lead or follow according to the necessities of the play

Differences between the two groups on 39-B and 39-C are statistically significant.

Responsibility: Only one item could be found which parallels the rating on responsibility in the Winnetka Behavior Scale: Item 37 of the extension scale, which deals with dependence on adults. The less responsible elementary group were more likely to have attempted things obviously too hard or refused to do things for themselves when in nursery school, and the more responsible nursery group were more likely to have done all reasonable things for themselves (37-C).

FOLLOW-UP OF PROBLEMS OVER SEVERAL YEARS

An attempt was made to study the course of the behavior problems present in the nursery school years during the two or three years following nursery school "graduation". Unfortunately there were not enough records for comparison on more than 10 problems reported by the teacher in nursery school and in the early grades and 6 problems reported by the mother. Those problems were calculated on the basis of 1) the per cent of children who had the problem at the age of four (the end of junior kindergarten); 2) the per cent who retained it after two years;[9] 3) the per cent for whom the problem diminished, and 4) the per cent of children who developed it during the two years after nursery school. Figure I gives the results of this comparison.

It may be seen that, of the behavior reported by the mother, teasing, sex curiosity, enuresis and telling untruths, if present at the end of junior kindergarten, tend to be present two years out of nursery school. In other words, more children retain this behavior than overcome or outgrow it during the two-year period. Mothers also report 23 to 33 per cent of the children developing teasing, telling untruths and nail biting during the two years following nursery school. It may be that mothers are particularly sensitive to the above problems and that this is a factor in the judgments as well as in the behavior which the children showed. It is also possible that pressure at home or school in these years may be a factor especially in telling untruths and nail biting. None of the children studied were reported by their mothers to develop in any degree the problems of enuresis or speech difficulty after the nursery school period.

Of the behavior reported by the teacher, "nervousness" (at least in terms of "marked overactivity") tended to persist during the two years following nursery school; 2) teasing or bullying, speech difficulties, imaginative lying and marked sex curiosity tended to be outgrown or overcome; 3) difficulties with other children, difficulty of management, negativism and telling untruths were retained by approximately as many children as outgrew or overcame them; and 4) more than 10 per cent of the children studied developed marked overactivity or "nervousness", difficulties with other children, difficulties of management, negativism, telling untruths or marked sex curiosity during the two years following nursery school. The teachers reported less than 10 per cent of the children tended to develop bullying, speech difficulties and imaginative lying.

It is important to note the large percentage of children who have not had the problems to any degree. For example over 60 per cent of all the children rated by the teachers did not at any time in the junior kindergarten or in first grade show a problem of marked sex curiosity, imaginative lying or speech difficulty. According to the mothers over 60 per cent did not to any degree evidence in the period studied enuresis, nail biting, marked sex curiosity or speech difficulties.

On the other hand, it may be seen that 79 per cent of all children studied were reported by their mothers to be teasers at one time during the period studied and that 50 per cent told untruths purposefully or imaginatively in the same period. Teachers reported that over 60 per cent of the children at one time were "nervous" or markedly over-active, were negativistic, difficult to manage or showed defiance to discipline, were difficult with other children or unpopular with them, or teased or bullied.

When the problems were studied for their tendencies in habitual frequency it was found that in general the same trends were noticeable excepting that the teachers noted a greater tendency for the habitual problems of negativism,

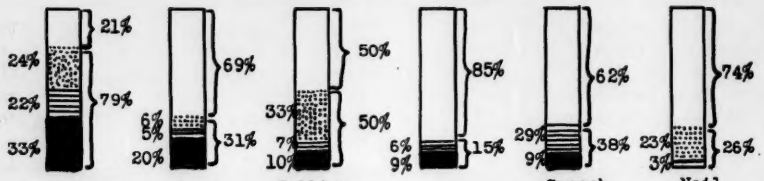
[9] *These same problems were also studied on the basis of frequency in all the follow-up classes in a particular year - thus giving a spread of one to four years after nursery school. Since the results were much the same and because the above specific designation of two years seemed more meaningful, the findings were omitted here.*

FIGURE I

THE COURSE OF CERTAIN NURSERY SCHOOL PROBLEMS IN THE ELEMENTARY SCHOOL
In order of degree to which problem was retained 2 years afterward

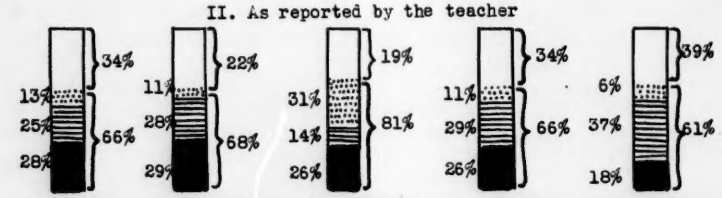
PROBLEMS OCCURRING TO ANY DEGREE OF FREQUENCY

I. As reported by the mother

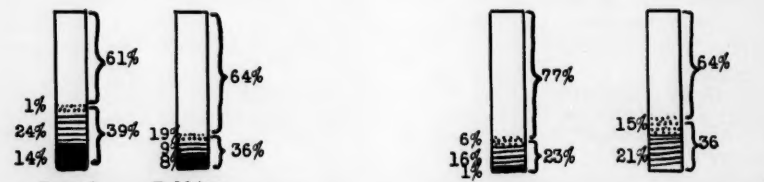


* =	60%	80%	59%	60%	24%	00%
N =	54	20	59	53	44	45

II. As reported by the teacher



* =	55%	51%	65%	47%	33%
N =	58	58	58	59	60



* =	37%	47%	6%	00%
N =	61	59	59	53

% who retained problem
% who developed problem
% who outgrew or overcame problem
% who never had problem

*Percent of original group still retaining problem 2 years out of Nursery School

telling untruths and difficulty in management to be retained after the nursery school period (see Figure II). Less than 10 per cent of the children were reported by their teachers or mothers to develop after the age of four any of the habitual problems studied. Also, with the exception of teasing, over 60 per cent of the children studied did not have any of these habitual problems at either time in the period described.

COMPARISON OF THE FOLLOW-UP GROUP WITH ALL WINNETKA SCHOOL CHILDREN

Since ratings on the Winnetka Scale for Rating School Behavior and Attitudes were made for all the public school children in Winnetka from the nursery school through grade six (approximately 1100 cases), the former nursery school children could be compared with this norm. Table VIII shows the analysis of ratings made in two different years. The 1935 group contains results of 71 ratings made from kindergarten through grade 5, the second group shows the same ratings without the kindergarten and the 1936 ratings on 45 cases from first grade to grade six. The group as a whole shows average ratings for each of the five divisions of the scale of from 3 to 18 per cent better than the Winnetka school population. It may be noted from the average of the two ratings that there is a tendency for these nursery school graduates to be better than the general school population in emotional adjustment and leadership. As is shown in Figure III, this tendency is noted in both of the yearly ratings. The lowest rating of the follow-up group is in responsibility but even this rating is on the average about 7 per

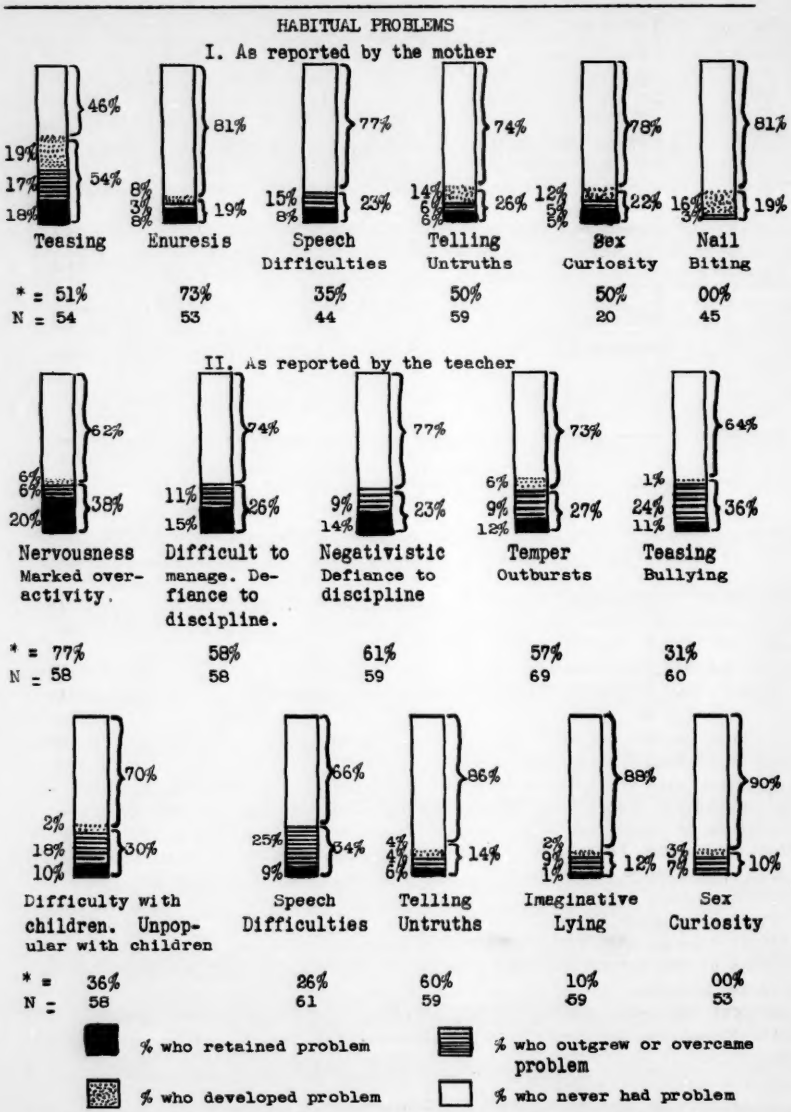
TABLE VIII

COMPARISON OF FOLLOW-UP GROUP WITH 1100 WINNETKA CHILDREN
(5.0 represents the median of the 1100 children)

	1935 rating with Kdg.	1935 rating without Kdg.	1936 rating without Kdg.	Average
N =	71	56	45	
Cooperation				
I Taking turns	5.9	5.7	5.6	5.7
II Cooperation in a group project	6.2	6.2	5.7	6.0
III Sacrifice for group	5.5	5.1	6.4	5.8
Total	5.8	5.7	5.9	5.8
Social Consciousness				
III Sacrifice for group	5.5	5.1	6.4	5.8
IV Application to social task	6.0	6.3	5.3	5.8
V Emotional tone	5.4	5.7	6.6	6.2
Total	5.6	5.7	6.1	5.9
Emotional Adjustment				
V Emotional tone	5.4	5.7	6.6	6.2
VI Independence of adult approval	6.3	6.4	6.4	6.4
VII Reaction to failure	6.1	6.4	7.2	6.8
Total	6.0	6.1	6.8	6.5
Leadership				
VIII Confidence in leadership	5.9	5.7	6.4	6.1
IX Direction of group tasks	6.5	6.4	7.1	6.8
X Social initiative	6.1	6.0	5.9	6.0
Total	6.2	6.0	6.5	6.3
Responsibility				
XI Planning of work	5.5	5.1	6.6	5.9
XII Independence of adult help	5.7	5.5	6.3	5.9
XIII Organization of materials for work	5.5	5.4	5.4	5.4
Total	5.5	5.3	5.4	5.4

FIGURE II

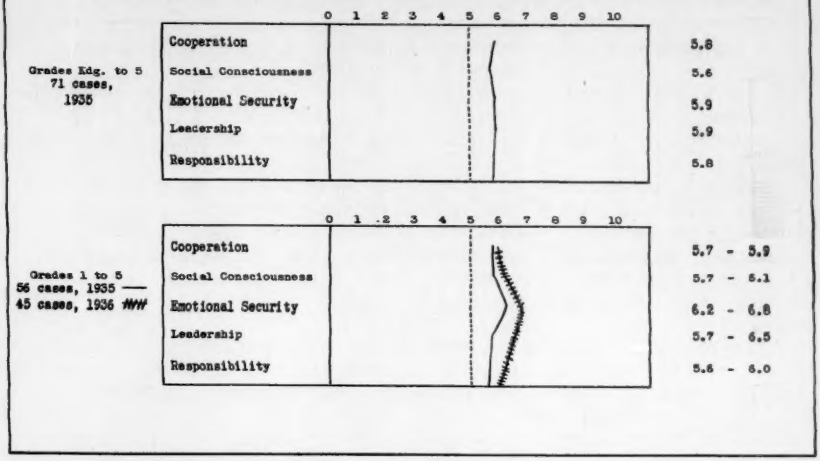
THE COURSE OF CERTAIN NURSERY SCHOOL PROBLEMS IN THE ELEMENTARY SCHOOL
In order of degree to which problem was retained 2 years afterward



*Percent of original group still retaining problem 2 years out of Nursery School.

FIGURE III

ALL FOLLOW-UP NURSERY SCHOOL GRADUATES CHARTED ON WINNETKA BEHAVIOR SCALE



cent higher than the general school population.

Analysis of the more specific items under each of the general headings shows the comparative strengths and weaknesses of this group. In the two best categories, emotional adjustment and leadership, the former nursery school children are best in "reaction to failure", "independence of adult approval" and in "direction of group tasks." They are also consistently high in both years' ratings of responsibility in "independence of adult help." Although the average of other ratings is almost as high as these, they are not consistent for the two-year ratings. The lowest average score of all and one which was consistently low in the case of both yearly ratings was under responsibility in "organization of materials for work."

Although one may say that this group was originally a somewhat selected one and may so explain the reasons for the consistently higher scores of this group in comparison with the general Winnetka School population, nevertheless analysis of the scores for specific situations reveals that the children were superior in the types of situations which nursery school education stresses. Building a desirable response toward failure, developing independence of adult approval and help, and encouraging adaptability in leadership are all important goals in the nursery school. The aspect in which this group was consistently low - organization of materials for work - has not been a goal which the nursery schools in general have emphasized. Perhaps it is necessary to re-evaluate objectives of the nursery school to decide whether this should or should not be part of the program.

As above indicated, in the type of superiority shown by former nursery school children, we see some clear-cut evidence of value in nursery school education.

SUMMARY AND CONCLUSIONS

The behavior of 165 elementary school children formerly in the Winnetka Public School Nursery Unit was studied on the basis of ratings and notations of

problem frequencies by three types of raters - the grade teacher, the mother and a trained observer. Since the composite of all their ratings had the highest correlation with those of the grade teacher the latter was taken as the criterion of post-nursery school adjustment throughout the study.

Ratings made in the nursery school years included use of the Haggerty-Olson Scale and checking of a problem frequency sheet by both the teacher and the mother. These same ratings were made in the elementary school by all three types of raters. In addition the child's grade teacher used the Winnetka Scale for Rating Behavior, especially constructed for this study.

The findings concerning the ratings on the Haggerty-Olson Scale were as follows:

1. Ratings found to be most in agreement were mother's and grade teacher's ratings of emotional traits ($r = .53$) and the grade teacher's and the observer's ratings on mental traits ($r = .52$) and on social traits ($r = .49$).

2. More specific agreements were that all three types of raters were in accord to a high degree on the child's sociability, talkativeness, reaction to failure, degree of leadership, degree of attention, flexibility and acceptance of authority.

3. The observer was more lenient than the mother and teacher although the mother was more lenient in rating the mental traits. The mother was more lenient than the teacher in the emotional traits and the teacher was more lenient than the mother in the social traits.

4. The traits about which the raters felt more uncertain were the emotional ones. They felt most certain about the social and mental traits.

5. The average ratings on the Haggerty-Olson Schedule B for 61 first grade Winnetka children compare closely with the norm established on 1537 children.

6. Comparison of Haggerty-Olson ratings made by teachers in nursery school with those made in early elementary school show that the highest predictability is in the physical traits ($r = +.50$) and the next highest in social traits ($r = +.46$). Positive but low were the emotional traits ($r = +.35$). A low correlation was found for mental traits ($r = -.03$).

Comparison of the behavior of better and less well adjusted groups in the nursery and elementary school showed that:

I. (As judged by the Haggerty-Olson Scale in the elementary school): the less well adjusted groups were habitually more difficult to manage, had more difficulty with children, sucked their thumbs and fought more often in nursery school (four-year level) and also tended to show the problems of negativism, temper outbursts, and jealousy in a higher percentage than the better adjusted.

II. (As judged by the Winnetka Scale for Rating Behavior and Attitudes in the Elementary School):

1. The less well adjusted groups when in nursery school were habitually more negativistic, difficult to manage, had more difficulty with others, more excessive crying, more teasing, more temper outbursts, more fighting and more "nervousness" and also tended to have the problems of thumbsucking, speech difficulties, fears and jealousy to a higher degree than the better adjusted groups. The differences in negativism between the two groups is statistically significant.

2. The less well adjusted groups when in the nursery school were less flexible, bolder, reacted more poorly to failure, acted more impulsively and unreflectively, were more negativistic and moody, and were described as showing less acceptable behavior and more extreme variations in affection.

3. Specific traits in which the better adjusted elementary groups differed from the poorly adjusted group to a statistically significant degree in nursery school were self-control in the face of failure or unpleasant situations, cooperation in discussion of their problems, adaptability in leadership and respect

for their own and other's property rights. The one trait on which the less well adjusted group was significantly outstanding was extreme submissiveness to frustrations or unpleasant situations.

4. The less cooperative group in elementary school were more difficult to manage, more assertive and more indifferent to other children in nursery school than the more cooperative group.

The group with less social consciousness in elementary school tended in the nursery school to be more indifferent toward other children, more assertive, and to be more stolid and show less changes of mood than the group who were better adjusted in terms of social consciousness.

The less well emotionally adjusted elementary group were, when in the nursery school, on the one hand both more impatient and easily irritated at frustrations but on the other hand more "easy going."

Those who were poorer in leadership in the elementary school were less likely to have shown adaptability in leadership in the nursery school and were more likely to have followed others, to have entered fewer social activities, and to have been somewhat bolder and more insensitive to the feelings of others. These differences in leadership, that is, the tendency for elementary school leaders to have shown adaptability in leadership in the nursery school and for the elementary school "followers" to have followed or imitated others in the nursery school, - are statistically significant.

The less responsible group in the elementary school were more likely in the nursery school to have been dependent on adults or to have attempted things obviously too hard.

All of these differences would probably be even more striking if the median of the follow-up group were not above that of the general school population, that is, if the more poorly adjusted group contained only actually badly adjusted children. The whole trend of the results, however, shows how closely behavior in the nursery school parallels that of the upper grades. For certain traits (particularly those analyzed in the Winnetka Behavior Scale) it is possible to predict from one period to another with some degree of certainty.

The study of the course of certain problems (occurring in "any" degree of frequency) on which data were obtained from the nursery school period through the early elementary school shows that:

1. According to the mothers:
   (a) Of the 6 problems studied those most likely to be retained (if present at the end of the junior kindergarten year) were teasing, telling untruths (to gain an end), marked sex curiosity and enuresis.
   (b) The problem most likely to diminish in frequency was that of speech difficulties.
   (c) The problems most likely to develop after this period were nail biting, teasing and telling untruths (to gain an end).
   (d) After the age of 4 none of the children studied developed speech difficulty or enuresis.
2. According to the teachers:
   (a) Of the 9 problems studied the one most likely to be retained was "nervousness" (or marked overactivity).
   (b) The problems that were retained by approximately the same percentage as outgrew or overcame them were: difficulties with other children, difficulty of management, negativism and telling untruths (to gain an end).
   (c) The problems (if existing at the end of junior kindergarten) most likely to be outgrown or overcome were marked sex curiosity, imaginative lying, teasing and speech difficulty.
   (d) The problems most likely to develop after the nursery school period

were marked over-activity ("nervousness"), telling untruths and marked sex curiosity.

(e) The problems least likely to develop after this period were bullying (teasing), speech difficulties and imaginative lying.

3. Over 50 per cent of the children studied were reported by their mothers during the two-year period to tease and to tell untruths. Over 60 per cent of the children were reported by teachers to show "nervousness", difficulty in management, defiance to discipline, difficulty with others, or teasing (or bullying). Over 60 per cent did not at either of these times have the problems of imaginative lying, marked sex curiosity, telling untruths (to gain an end) or speech difficulty.

When the problems were studied for their tendencies in habitual frequency it was found that in general the same trends were noticeable with the exception that the teachers noted a greater tendency for the habitual problems of negativism, telling untruths and difficulty in management to be retained after the nursery school period. (See Figure II). Less than 10 per cent of the children were reported by their teachers or mothers to develop after the age of four any of the habitual problems studied. Also, with the exception of teasing, over 60 per cent of the children studied did not have any of these habitual problems at either time in the period described.

When the follow-up group is compared with the general Winnetka School population on the basis of two yearly ratings on the Winnetka Scale for Rating Behavior and Attitudes, it is found that the group had from 3 to 18 per cent better scores than the norm and that there is a tendency for the children who had attended nursery school to evidence better emotional adjustment and leadership. The former nursery school group is better than the general school population in "reaction to failure", "independence of adult approval", "direction of group tasks", and "independence of adult help." The lowest score (but still above the norm) was in "organization of materials for work." It is possible that the influence of nursery school makes the group as a whole as much better than the norm as indicated, but since this group was a somewhat selected and superior group in the first place it is not probable. It is likely, however, that in the particular situations in which children who had attended the nursery school showed most superiority the influence of the nursery school can be seen, particularly when comparison with the goals of the nursery school is made.

Throughout the study it must be noted that the better adjusted group is more adaptable and more flexible already in the nursery school than in the less well adjusted group.[10] In other words, early inflexibility may be basic to future difficulties but early adaptability predicts future good adjustment.

Specific signals of possible or potential dangers as seen at least in the four-year-old group would be the following problems if present to an unusual degree: difficulty in management, difficulty with other children, negativism, thumb-sucking, lack of adaptability in leadership, poor reaction to failure or unpleasant situations, lack of willingness to take turns with toys, lack of alertness in exploring the environment, too much assertiveness, lack of sensitiveness to the feelings of others, too frequent changes in mood, lack of patience and persistence, dependence on adults, and extreme variations in affection.[11]

Every effort should therefore be made in the early years to find the causes of these difficulties and remove them if possible. Certain aspects of behavior

[10] *This more poorly adjusted group might be thought of merely as an "aggressive" group if the results of the Haggerty-Olson Scale only were taken. The ratings on the Winnetka Behavior Scale show other quite different characteristics such as responsibility, social consciousness, emotional adjustment, etc.*

[11] *The broader divisions of the Haggerty-Olson Scale differentiations between the two groups are not as indicative as the various aspects. The most significant items for future investigation are the following: 31:1 and 2; 17:1; 2 and 3; 29:1; 33:1; 21:1; 29:1 and 3; 20:4; 18:3; and 5; 33:3; and 39:B, C and D; and 41:C of the extension (See Appendix).*

discussed in this study, too frequently called "problems", should not be of too much concern to parents and teachers at the four-year level because 1) they are very likely to diminish with age or 2) they are characteristic of the young child 4 to 5 (i.e., over 75 per cent had the problems). These include teasing and "nervousness" or marked over-activity.

The study in general agrees with previous findings of other researches that the nursery school makes for social adaptability, indepéndence, self-assertiveness, self-reliance, and interest in environment. It adds as a significant finding that the nursery school makes for better emotional adjustment and leadership. A particularly indicative aspect of emotional adjustment is the child's reaction to failure.

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APPENDIX

EXTENSION OF THE HAGGERTY-OLSON RATING SCALE

36. How much does he seek attention to himself?
    - A. Very frequently makes direct demands for attention.
    - B. Very frequently seeks attention indirectly by showing off.
    - C. Occasionally seeks attention either directly or indirectly.
    - D. Seeks attention only when occasion warrants.
    - E. Never seems to seek attention.

37. How much is he dependent on adults?
    - A. Refuses necessary help.
    - B. Attempts things obviously too hard.
    - C. Does all reasonable things for self.
    - D. Attempts to help self only when urged.
    - E. Refuses to do things for self.

38. What is his degree of sociability?
    - A. Dislikes being alone; always seeks others.
    - B. Prefers to be with children, but can be self-sufficient.
    - C. Indifferent towards other children; enters activity with other children only when urged.
    - D. Avoids other children.
    - E. Actively resists being with other children.

39. Does the child tend to lead or follow?
    - A. Always follows others - no initiative.
    - B. Generally tends to follow others, imitates the play of others.
    - C. Willing to lead or follow according to the necessities of the play.
    - D. Tends to lead others in certain activities.
    - E. A leader in practically all activities, shows much initiative.

40. Does he respect the property rights of others?
    - A. Frequently grabs other's toys (or materials).
    - B. Occasionally takes toys without other's permission.
    - C. Takes turns willingly.
    - D. Asks politely for other child's toys.
    - E. Never asks for or takes another child's toys.

41. Does he defend his own property rights?
    - A. Never gives up toys (or materials) unless forced.
    - B. Gives up toys only upon suggestion.
    - C. Takes turns willingly but defends own rights.
    - D. Offers toys without being asked.
    - E. Always gives up toys without resistance; does not defend own rights.

42. Does he like to explore his environment? (Experimentation with toys or machinery, independent adventure).
    - A. Inquires or explores to extreme degree, at times being venturesome or destructive in his desire to find out.
    - B. Explores environment without regard for others' rights.
    - C. Is alert, likes to explore.
    - D. Occasionally likes to explore.
    - E. Is content with things as they are.

43. Does he like to construct, or is he creative in other ways, such as imaginative play, rhythms, stories, drawing, clay, etc.?
    - A. Spends most of his time in creating or constructing at times pushing himself to the point of fatigue.
    - B. Likes to create or construct. Does average amount.
    - C. Does less than average amount of creating or constructing.
    - D. Rarely creates or constructs, but keeps busy at other things.
    - E. Shows little interest in creating or constructing frequently being desultory in his activity.

APPENDIX

BEHAVIOR PROBLEM SHEET

Child's name _____ Information supplied by _____

Date _____ Information recorded by _____

Please check below which of the following is the number of times these difficulties have occurred in the last THREE months:

BEHAVIOR DIFFICULTY	Never	1-3 times	4-10 times	11-12 (about once a week)	2-5 a week	6-7 a week (almost daily)	2 or more times a day
Eating difficulty							
Refusal of certain foods							
Dawdling							
Apparent lack of appetite							
Vomiting disliked food							
Desire to be fed							
Sleeping difficulty							
Refuses to go to bed at nap time							
Does not sleep at nap time							
Cries, whines when put to bed							
Refuses to stay in bed							
Kicks, jerks, tosses or talks in sleep							
Has bad dreams							
Cries in sleep							
Wakes up frightened							
Awakens often							
Enuresis							
Wets self during day							
Wets self during nap							
Wets self during night							
Thumb or finger-sucking							
During day							
At nap or bedtime							
Nail-biting							
During day							
At nap or bedtime							
Sex							
Handles sex organs							
Shows much sex curiosity (asks many questions about babies, sex organ, etc., or seems very aware of opposite sex in bathroom)							
Difficult to manage							
Unwilling to cooperate with adult							
Ignores requests							
Easily managed by one person only							
Cannot be reasoned with							
Has difficulty in getting on with other children							
Will not share or take turns							
Hits, slaps or interferes with play or other children							
Does not stand up for own rights							
Other children dislike him							
Dislikes other children							
Likes to boss other children							
Refuses to cooperate with others							
Teasing							
Takes toys from other children							
Playfully frightens others							
Is annoying in any other way							
Fighting							
Strikes, slaps or pushes other children							
Kicks, scratches or bites other children							
Cruelty							
Hurts to produce extreme pain							
Purposely in children, animals or toys							
Jealousy							
Shows resentment toward attention given to another							
Temper outbursts							
Screams, kicks, stamps feet or throws self on floor							
Crying spells							
Cries often at insignificant things, at first bump, etc.							
Has prolonged crying spells							

BEHAVIOR PROBLEM SHEET (Continued)

BEHAVIOR DIFFICULTY	Never	1-3 times	4-10 times	11-12 (about once a week)	2-5 a week	6-7 a week (almost daily)	2 or more times a day
Tendency to sulk or whine							
Tendency to day-dream							
While dressing, etc.							
While playing							
Negativistic							
Unwilling to cooperate							
Says "no" to suggestions							
Refuses to act							
Demands much adult attention							
Constantly seeks attention of adult by calling or "showing off"							
Must be near an adult							
Asks unnecessary help							
Looks for much praise							
Marked irritability							
Cross							
Easily annoyed							
Fussy							
Has complaining attitude							
Marked nervousness							
Shows signs of tension such as twitching, shaking, clenching hands, etc.							
Over-active							
"High-strung"							
Marked sensitiveness							
Extremely shy							
Easily hurt							
Cries easily							
Marked self-consciousness							
Hangs head							
Refuses to talk or act if attention is focused upon him							
Is inclined to think group is speaking about him							

BEHAVIOR DIFFICULTY	Never	1-3 times	4-10 times	11-12 (about once a week)	2-5 a week	6-7 a week (almost daily)	2 or more times a day
Destroys things (Purposely breaks dolls, tears books, marks furniture, breaks dishes, etc.)							
Fears							
Cries or shows tenseness at							
Dark							
Dogs							
Cats							
Strangers							
Masks							
"Boogey man"							
Lightning							
Loud noises							
Nervous habits							
Biting lips							
Chewing handkerchief							
Nose-picking							
Blinking eyes							
Twisting hair or clothes							
Pulling ear							
Twitching any part of body							
Wriggling about a great deal when sitting							
Tells untruths							
Imaginative stories (as in play situation or telling a story)							
Purposefully (to gain an end)							
Speech difficulties							
Stutters or stammers							
Talks "baby talk"							
Hesitant speech							
Was slow in speech development							
Other behavior difficulties:							